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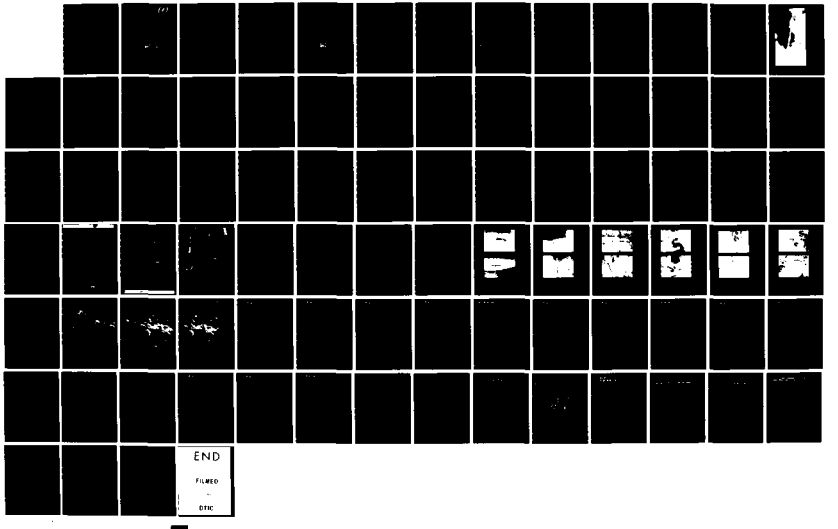

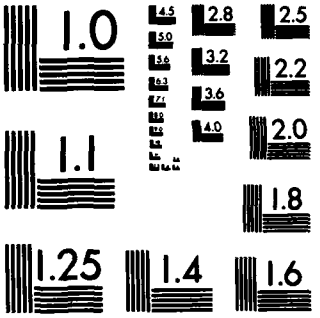

HOUSATONIC RIVER BASIN

GOSHEN, CONNECTICUT

NORTH POND DAM
CT 00450

HOUSATONIC RIVER BASIN

NORFOLK CONNECTICUT

NORTH POND DIKES
CT 00681

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY

NEW ENGLAND DIVISION, CORPS OF ENGINEERS

WALTHAM, MASS. 02154

AUGUST, 1979

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER CT 00450 and CT 00681	2. GOVT ACCESSION NO. AD-A144 602	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) North Pond Dam North Pond Dikes NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		5. TYPE OF REPORT & PERIOD COVERED INSPECTION REPORT 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254		12. REPORT DATE August 1979 13. NUMBER OF PAGES 55
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

DAMS, INSPECTION, DAM SAFETY,
Housatonic River Basin
Goshen, Connecticut
Norfolk Connecticut

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The project consists of a dam at the south end of the pond and two dikes at the northeast end of the pond. The approximately 19.5 foot high dam on Hart Brook is an earth embankment approximately 325 feet in length including, at the left end of the dam a 37 foot long rounded, broad-crested concrete spillway founded on rock. Based upon the visual inspections, the dam appears to be in good condition while the dikes appear to be in poor condition. For the intermediate size and high hazard classification of the project, the test flood will be equivalent to the PMF.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDED

FEB 4 1980

Honorable Ella T. Grasso
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor Grasso:

Inclosed is a copy of the North Pond Dam & Dike Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, the Torrington Water Company, Torrington, Connecticut.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

MAX B. SCHEIDER
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

HOUSATONIC RIVER BASIN

GOSHEN, CONNECTICUT

NORTH POND DAM
CT 00450

HOUSATONIC RIVER BASIN

NORFOLK CONNECTICUT

NORTH POND DIKES
CT 00681

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS. 02154

AUGUST, 1979

BRIEF ASSESSMENT

PHASE I INSPECTION REPORT

NATIONAL PROGRAM OF INSPECTION OF DAMS

Name of Dam:	NORTH POND DAM
Inventory Number:	CT 00450
State Located:	CONNECTICUT
County Located:	LITCHFIELD
Town Located:	GOSHEN
Stream:	HART BROOK
Owner:	TORRINGTON WATER COMPANY
Dates of Inspections:	4/5/79, 6/6/79
Name of Dam:	NORTH POND DIKES
Inventory Number:	CT 00681
State Located:	CONNECTICUT
County Located:	LITCHFIELD
Town Located:	NORFOLK
Stream:	TRIBUTARY TO HALL MEADOW BROOK
Owner:	TORRINGTON WATER COMPANY
Date of Inspection:	6/6/79
Inspection Team:	CALVIN GOLDSMITH
	PETER HEYNEN, P.E.
	THEODORE STEVENS
	JAY COSTELLO
	GONZALO CASTRO, P.E.

The project consists of a dam at the south end of the pond and two dikes at the northeast end of the pond as shown in Appendix B, Sheet B-2. The approximately 19.5 foot high dam on Hart Brook is an earth embankment approximately 325 feet in length including, at the left end of the dam, a 37 foot long rounded, broad-crested concrete spillway founded on rock. The top of the dam has a typical width of seven feet. The upstream slope is at a two horizontal to one vertical inclination, while the downstream slope is inclined at 2.5 horizontal to one vertical. There is a small wood gatehouse atop a portion of the embankment retained on the upstream side by a masonry wall.

The two dikes along the northeast edge of the reservoir are referred to in this report as the North Dike and the South Dike. The dikes are about 8 feet and 15 feet high respectively, on the downstream side. The shape of the dikes is very irregular; the crest elevation is not constant, and is, on the average, four feet lower than the crest of the dam. The downstream slopes are locally very steep, up to about 1.5 horizontal to 1 vertical.

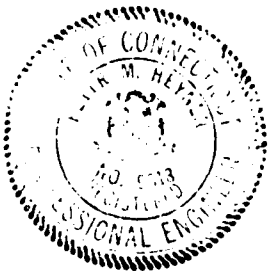
Based upon the visual inspections, the dam appears to be in good condition while the dikes appear to be in poor condition. No evidence of instability was observed in the dam or dikes, however, the height of the dikes is inadequate; the dikes have an irregular configuration and excessively steep slopes; there is extensive tree and brush growth on the dikes and seepage through the dikes and dam.

In accordance with Corps of Engineers guidelines, for the intermediate size and high hazard classification of the project, the test flood will be equivalent to the Probable Maximum Flood (PMF). Peak inflow to the reservoir is 2,300 cubic feet per second (cfs); peak outflow is 1,240 cfs with the dikes overtopped 0.8 feet. The spillway capacity to the point of overflow of the dikes is 120 cfs which is equivalent to 10% of the routed test flood outflow.

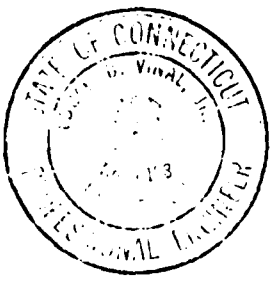
It is recommended that further studies be undertaken to perform a more refined hydraulic/hydrologic study to formulate a design for raising the dikes.

It is also recommended that a registered professional engineer, qualified in dam design and inspection, develop recommendations for the rehabilitation or reconstruction of the dikes. The recommendations should include provisions for removal of brush and trees, reshaping of the crest and downstream slopes and providing adequate upstream slope protection, as well as control or elimination of the seepage.

The above recommendatons, and the remedial measures, both of which are described in Section 7, should be instituted within 1 year of the owner's receipt of this report.



Peter M. Heynen, P.E.
Project Manager
Cahn Engineers, Inc.



Edgar B. Vinal, Jr., P.E.
Senior Vice President
Cahn Engineers, Inc.

This Phase I Inspection Report on North Pond Dam & Dike has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

Joseph W. Finegan

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

Carney M. Terzian

CARNEY M. TERZIAN, MEMBER
Design Branch
Engineering Division

Joseph A. McElroy

JOSEPH A. MCELROY, CHAIRMAN
Chief, NED Materials Testing Lab.
Foundations & Materials Branch
Engineering Division

APPROVAL RECOMMENDED:

Joe B. Fryar

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspection. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam would necessarily represent the condition of the dam at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions will be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions there of. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as neccessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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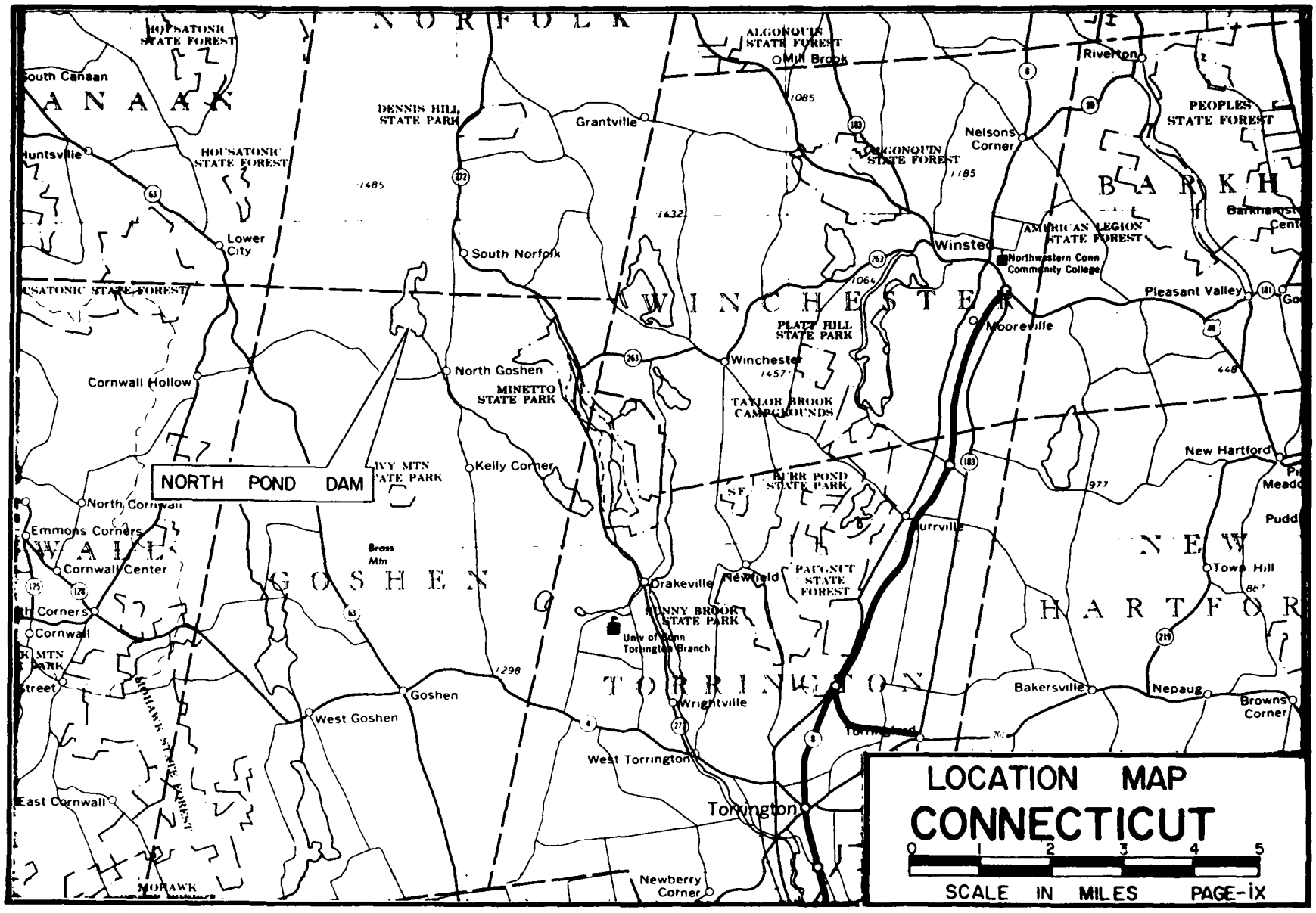
OVERVIEW PHOTO
(March 1979)

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS	NATIONAL PROGRAM OF	NORTH POND DAM	GOSHEN	DATE Aug'79
CAHN ENGINEERS INC. WALLINGFORD, CONN ENGINEER	INSPECTION OF NON-FED DAMS	HART BROOK	CONNECTICUT	CE # 27 595 KE PAGE viii


NORFOLK
HOUSATONIC STATE FOREST
South Canaan
ANAAK
DENNIS HILL STATE PARK
Grantville
ALGONQUIN STATE FOREST
Mill Brook
Riverton
PEOPLES STATE FOREST
Nelsons Corner
ALGONQUIN STATE FOREST
HOUSATONIC STATE FOREST
Lower City
South Norfolk
AMERICAN LEGION STATE FOREST
Winsted
Northwestern Conn Community College
Pleasant Valley
WINCHESTER
PLATT HILL STATE PARK
Mooreville
Winchester
North Goshen
MINETTO STATE PARK
TAYLOR BROOK CAMPGROUNDS
Cornwall Hollow
NORTH POND DAM
Kelly Corner
New Hartford
North Cornwall
Emmons Corners
Cornwall Center
Brass Mtn
GOSHEN
Drakeville
Newfield
PAUGNUT STATE FOREST
SUNNY BROOK STATE PARK
Univ of Conn Torrington Branch
Town Hill
HARTFOR
Cornwall
Goshen
Wrightville
Bakersville
Nepaug
Browns Corner
West Goshen
West Torrington
East Cornwall
Torrington
Newberry Corner
MOHAWK
LOCATION MAP
CONNECTICUT
0 1 2 3 4 5
SCALE IN MILES

PHASE I INSPECTION REPORT

NORTH POND DAM

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority - Public Law 92-367, August 8, 1972, authorized the Secretary of the Army, through the Corps of Engineers, to initiate a National Program of Dam Inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of supervising the inspection of dams within the New England Region. Cahn Engineers, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed were issued to Cahn Engineers, Inc. under a letter of November 28, 1978 from Max B. Scheider Colonel, Corps of Engineers. Contract No. 33-79-C-0014 has been assigned by the Corps of Engineers for this work.

b. Purpose of Inspection Program - The purposes of the program are to:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions requiring correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to guickly initiate effective dam inspection programs for non-federal dam.

3. To update, verify and complete the National Inventory of Dams.

c. Scope of Inspection Program - The scope of this Phase I inspection report includes:

1. Gathering, reviewing and presenting all available data as can be obtained from the owners, previous owners, the state and other associated parties.

2. A field inspection of the facility detailing the visual condition of the dam, embankments and appurtenant structures.

3. Computations concerning the hydraulics and hydrology of the facility and its relationship to the calculated flood through the existing spillway.

4. An assessment of the condition of the facility and corrective measures required.

It should be noted that this report does not pass judgement on the safety or stability of the dam other than on a visual basis. The inspection is to identify those features of the dam which need corrective action and/or further study.

1.2 DESCRIPTION OF PROJECT

a. Location - The dam is located on Hart Brook in a rural area of the town of Goshen. The dikes are located at the headwaters to an unnamed tributary to Hall Meadow Brook in a rural area of the town of Norfolk. Both the dam and the dikes are located in the County of Litchfield, State of Connecticut and shown on the Norfolk USGS Quadrangle Map, the dam having coordinates latitude N 41° 54.5' and longtidue W 73° 13.2', the North Dike having coordinates latitude N 41° 55.2' and longitude W 73° 13.1' and the South Dike having coordinates latitude N 41° 55.1' and longitude W 73° 13.1'.

b. Description of Dam and Appurtenances - As shown on Sheet B-1, the approximately 325 foot long dam is an earth embankment, the top of which at elevation 1469, is approximately 19.5 feet above the streambed of Hart Brook. The upstream slope, inclined at approximately two horizontal to one vertical is protected by riprap to an elevation approximately three feet below the crest. The approximately seven foot wide crest is grass covered as is the downstream slope which is inclined at approximately 2.3 horizontal to one vertical. It is not known if the dam contains a corewall, nor is it known upon what the dam is founded.

The 37 foot long spillway is a rounded, broad-crested concrete sill with a crest elevation of 1464. No elevations were available for the dam, therefore the water surface elevation of 1464 for North Pond shown on the Norfolk U.S.G.S. Quadrangle Map was assumed to be the elevation of the spillway crest. All other elevations used throughout this report are referenced to the assumed spillway crest elevation. The spillway, located at the left end of the dam, is founded on rock. To the left of the spillway is a rock abutment and an approximately 100 foot long flat area of densely vegetated natural ground which is at an elevation approximately two feet lower than the top of the dam and three feet above the spillway. This area considerably increases the effective spillway capacity, allowing water to spill out over it at heads of three feet or more above the spillway crest. To the right of the spillway is a masonry training wall against the dam embankment.

Towards the center of the dam, on the crest, is a small wood gatehouse which houses a single tee-bar valve control to the 10 inch low level outlet through the dam. A masonry retaining wall on the upstream edge of the dam surrounds the gatehouse on three sides allowing the top of the embankment to extend to the water's edge thus creating the flat area upon which the gatehouse is supported. An approximately four foot wide intake channel at approximate elevation 1451 is located at the upstream base of the retaining wall.

The low level outlet discharges into the streambed at a masonry headwall at the toe of the dam. A measuring weir of concrete block construction has been constructed across the stream approximately 20 feet downstream of the outlet headwall.

At the northeast extremity of the lake are two irregularly shaped earth dikes identified as the North and South Dikes, both rising to approximate elevation 1465 or only one foot above the spillway crest elevation. Between the two dikes are small knolls which are separated by an approximately 250 foot long low area of natural ground along the water's edge which is also at approximate elevation 1465. (See Sheet C-2).

The northernmost, or North Dike is approximately 120 feet long and approximately eight feet in height from the top of the dike to the bottom of an apparent borrow excavation at its toe. The trench along the toe does not drain and contains approximately two feet of standing water. There are other borrow excavations at the left and right ends of the North Dike. The upstream slope of the dike is marginally protected by boulders placed along the shoreline. The downstream slope is steep at an inclination of approximately 1.5 horizontal to 1 vertical. The two to three feet wide crest is irregular in elevation and is densely vegetated as are the slopes.

The South Dike is approximately 15 feet high and 200 feet long with a crest width of two to three feet and a downstream slope inclined as steeply as 1.5 horizontal to 1 vertical. The upstream slope is apparently normally above water as there is a broad, flat, rocky shoreline upstream of the dike. The borrow for the South Dike construction was also apparently excavated adjacent to the toe. The South Dike is also densely vegetated.

c. Size Classification - INTERMEDIATE - Under existing conditions, overtopping of the dikes will occur at approximate elevation 1465. The maximum attainable storage of the reservoir to the top of dikes is estimated to be approximately 2500 acre-feet (Appendix D-1, D-2). Assuming the dikes are raised to the elevation of top of the dam, the storage of the project would be 3500 acre-feet of water with the reservoir level at the top of the dam, which at elevation 1469 is approximately 19.5 feet above the streambed of Hart Brook. According to the Recommended Guidelines, a dam with either of the above storage capacities is classified as intermediate in size.

d. Hazard Classification - HIGH - If either of the dikes were to be breached, there is potential for loss of life and extensive property damage at three residences on East Street (Conn. Route 272) approximately 2000 feet downstream of the dikes.

The potential impact area for a breach of the dam would be downstream of Reuben Hart Reservoir Dam at Drakeville, however the residences in this area are approximately ten feet above the streambed. Therefore, the potential for loss of life and property damage at this impact area is minimal.

e. Ownership - The Torrington Water Company
Mr. Richard Calhoun, President
110 Prospect Street
P.O. Box 867
Torrington, Connecticut 06790
(203) 489-4149

The dam was originally owned by the American Brass Company, which sold it to the Torrington Water Company around 1900.

f. Operator - Though the dam is normally unattended, a representative of the Torrington Water Company does visit the site daily.

Mr. William Jones
Superintendent
Torrington Water Company
(203) 489-4149

g. Purpose of Dam - North Pond is a water storage reservoir for a downstream distribution reservoir.

h. Design and Construction History - Originally there was a natural pond which was expanded by construction of a dam on this site in 1840 by the American Brass Company. This information was ascertained by the present owner from the daily operations records kept by the owner of a sawmill on Hart Brook. Apparently the construction of the dam significantly altered the flow of water in the stream affecting the operation of his water powered sawmill.

The dam was raised approximately 4 feet to its present height by its present owner either in 1913 or 1926. There is a discrepancy in the Torrington Water Company's ledger which was begun around 1940 and shows both dates for the raising of the dam. It is not even known if the original dam was raised or entirely reconstructed.

The dikes were constructed shortly after the dam was raised, when it was discovered that water was spilling out of the reservoir at two locations, thus preventing the reservoir from filling to the spillway crest elevation.

i. Normal Operational Procedures - Only rarely is there any flow over the spillway as the valve for the single 10 inch pipe through the dam is normally partially open to release water downstream to Reuben Hart Reservoir. The amount of flow released through the low level outlet is closely monitored. This flow data, in correlation with precipitation and lake-level data is being used to determine if there are springs beneath the pond.

1.3 PERTINENT DATA

a. Drainage Area - The drainage area is 0.94 square miles of undeveloped, wooded, rolling terrain of which the reservoir area comprises approximately 30 percent.

b. Discharge at Damsite - Discharge through the dam is by the ten inch low level outlet pipe. Overflow from the reservoir will occur; first, over the spillway; second, over the dikes and low area of natural ground at the northeast end of the reservoir and third, over the low area to the left of the spillway before the dam is overtopped.

1.	Outlet Works	One 10" cast iron pipe @ invert el. 1452±
2.	Maximum known flood @ damsite:	N/A
3.	Ungated spillway capacity @ top of dam el. 1469: (including low area at left end of dam)	2100 cfs.
	Ungated spillway capacity @ top of dikes el. 1465:	120 cfs.
4.	Ungated spillway capacity @ test flood el. 1465.8:	310 cfs. (930 cfs. outflow over dikes)
5.	Gated spillway capacity @ normal pool el.:	N/A
6.	Gated spillway capacity @ test flood el.:	N/A
7.	Total spillway capacity @ test flood el. 1465.8:	310 cfs
8.	Total project discharge @ test flood el. 1467:	640 cfs. (dikes raised)
	Total project discharge @ test flood el. 1465.8:	1240 cfs (under existing conditions)

c. Elevations (Feet Above Mean Sea Level)

1.	Streambed @ centerline of dam:	1449.5±
2.	Maximum tailwater:	N/A
3.	Upstream portal invert diversion tunnel:	N/A
4.	Recreation pool:	N/A
5.	Full flood control pool:	N/A
6.	Spillway crest:	1464 (assumed)
7.	Design surcharge (original design):	N/A
8.	Top of dam:	1469±
	Top of dikes:	1465±
9.	Test flood design surcharge:	1467 (dikes raised) 1465.8 (under existing conditions)

d. Reservoir

1.	Length of maximum pool:	6000+ ft.
2.	Length of recreation pool:	N/A
3.	Length of flood control pool:	N/A

e. Storage

1.	Recreation pool:	N/A
2.	Flood control pool:	N/A
3.	Spillway crest pool:	2300± acre-ft.
4.	Top of dam:	3500± acre-ft.
	Top of dikes:	2500± acre-ft.
5.	Test flood pool:	2650± acre-ft.

f. Reservoir Surface

1.	Recreation pool:	N/A

2.	Flood control pool:	N/A
3.	Spillway crest:	185± acres
4.	Test flood pool:	215± acres
5.	Top of dam:	290± acres
g.	Dam	
1.	Type:	Earth embankment
2.	Length:	325± ft.
3.	Height:	19.5 ± ft.
4.	Top width:	7± ft.
5.	Side slopes:	2H to 1V Upstream 2.3H to 1V Downstream
6.	Zoning:	N/A
7.	Impervious core:	Not Known
8.	Cutoff:	N/A
9.	Grout curtain:	N/A
10.	Other:	N/A
	South Dike	
1.	Type:	Earth embankment
2.	Length:	200± ft.
3.	Height:	15± ft.
4.	Top width:	3± ft.
5.	Side slopes:	Irregular upstream 1.5H to 1V downstream (Approx. - varies)
6.	Zoning:	N/A
7.	Impervious core:	N/A
8.	Cutoff:	N/A
9.	Grout curtain:	N/A

10.	Other:	N/A

North Dike

1.	Type:	Earth embankment
2.	Length:	120± ft.
3.	Height:	8± ft.
4.	Top width:	3± ft.
5.	Side slopes:	irregular upstream 1.5H to 1V downstream (Approx. - varies)
6.	Zoning:	N/A
7.	Impervious core:	N/A
8.	Cutoff:	N/A
9.	Grout curtain:	N/A
10.	Other:	N/A

h. Diversion and Regulating Tunnel - N/A

i. Spillway

1.	Type:	Rounded, broad-crested concrete sill.
2.	Length of weir:	37± ft.
3.	Crest el.:	1464 (assumed)
4.	Gates:	N/A
5.	Upstream channel:	Shallow reservoir bottom
6.	Downstream channel:	Natural exposed bedrock
7.	General:	N/A

j. Regulating Outlets - The single regulating outlet is a ten inch diameter cast iron pipe through the dam.

1.	Invert:	1452±

2.	Size:	10" dia.
3.	Description:	Cast iron
4.	Control mechanism:	Manually operated tee-bar valve control in gatehouse
5.	Other:	Ponding of water at outlet due to measuring weir downstream of outlet headwall.

SECTION 2: ENGINEERING DATA

2.1 DESIGN

a. Available Data - The available data consists of inventory data by the State of Connecticut.

b. Design Features - No information was available.

c. Design Data - There were no engineering values, assumptions, test results or calculations available for the original construction and subsequent raising of the dam or for the construction of the dikes.

2.2 CONSTRUCTION

a. Available Data - No information was available.

b. Construction Considerations - No information was available.

2.3 OPERATIONS

Lake level and downstream flow readings are taken daily by the owner. It was reported that the dam spillway capacity has never been exceeded. No formal operations records, other than the lake level and flow readings are known to exist.

2.4 EVALUATION

a. Availability - The inventory data was provided by the Water Resources Unit of the Connecticut Department of Environmental Protection. The owner made the facilities available for visual inspection.

b. Adequacy - There was no detailed engineering data available, therefore the final assessment of this project must be based on visual inspection,performance history, hydraulic computations of spillway capacity and approximate hydrologic judgements.

c. Validity - A comparison of records data and visual observations reveals no observable significant discrepancies in the record data.

SECTION 3: VISUAL INSPECTION

3.1 FINDINGS

a. General - The general condition of the dam is good, however the general condition of the dikes is poor. Areas of concern are heavy brush and tree growth, seepage, steep slopes, irregular shape and inadaquate height.

At the time of the initial inspection on April 5, 1979 there was a considerable accumulation of snow at the downstream toe of the dam as shown in Appendix C, Photo 1. In order to see conditions at the toe of the dam, another inspection of the site was made on June 6, 1979 at which time the dikes were inspected. From the preliminary survey of the dam on the latter date, the water surface was 1.2 feet below the spillway crest. A hand level survey of the dikes on the same day revealed the top elevation to be approximately 2 to 2.2 feet above the water surface. Relative elevations for the dam and dikes were determined assuming a constant water surface elevation on the date of the survey.

b. Dam

Crest - The crest of the dam is grassed and in good condition with no signs of erosion, movement or settlement (Photo 1).

Upstream Slope - The upstream slope of the dam is protected by riprap to about three feet from the crest (Photo 2). The riprap is in good condition and there is a well-maintained grass cover on the slope above the riprap.

Downstream Slope - The downstream slope of the dam is grass covered and in good condition with no signs of sloughing or erosion (Photo 1). There is no indication of seepage on the slope, however at the toe of the slope and left of the outlet channel are two minor seeps, approximately located on Sheet B-1. The seep closer to the outlet headwall is shown in Photo 6. There are no indications of soil movement at present, though a slight depression around the seeps might possibly indicate minor past erosion.

Spillway - The spillway may be described as a rounded, broad-crested, concrete sill approximately 2.5 feet in height above the upstream approach channel and 5.7 feet broad. The 37 foot long spillway is founded on rock and, at its left end, meets a rock abutment, the top of which is two feet below the top of the dam (Photo 3). The concrete is in very good condition, however there is seepage emanating from the contact of the spillway with bedrock (Photo 4).

Between the spillway and the embankment is a stone masonry training wall which consists of two walls side by side. The left wall is lower and forms a sill between the spillway and the higher wall adjacent to the embankment (Photo 4). There is a small seep at the base of the wall as located on Sheet B-1 and shown in Photo 5. The higher wall rises approximately eight inches above the embankment and some minor erosion is occuring on the upstream and downstream slopes of the dam adjacent to the wall. The upstream end of the wall has deteriorated probably as a result of ice pressures (Photo 2).

North Dike - The approximately 120 foot long irregularly shaped dike is overgrown on its crest and slopes with trees and brush. The approximately three foot wide crest, although not constant in elevation, has an approximate average elevation of 1465. The dike is approximately eight feet in height from the crest to the downstream toe, however the original natural ground surface slopes down away from the reservoir, thus the dike is lower with respect to the upstream toe. The upstream slope is marginally protected by large boulders placed along the shoreline. Material for the dike was apparently excavated from a trench at the downstream toe which presently contains approximately two feet of standing water (Photo 9). Other apparent borrow excavations are located at the right and left ends of the dike. The downstream slope, although not constant in inclination has locally very steep slopes, approximately 1.5 horizontal to 1 vertical (Photo 9). It appears that there may be seeps on the downstream slope as judged by local rust staining in the water.

South Dike - The South Dike, very similar to the North Dike in construction and present condition, is approximately 200 feet long and 15 feet in height from its crest to its downstream toe. The irregular crest has an average approximate elevation of 1465 and is approximately three feet wide. The downstream slope of the South Dike, although generally less steeply inclined than that of the North Dike, has locally steep inclinations of 1.5 horizontal to one vertical (Photo 10). Two substantial seeps were observed at the downstream toe of the dike (Photos 11 & 12). One seep, located near the right end of the dike was 6.5 feet below the water surface at the time of inspection. The other seep was located at the center of the embankment where the dike reaches its maximum height.

c. Appurtenant Structures

On the crest of the dam is a small wood gatehouse which houses a single tee-bar valve control (Photos 1&2). Both the gatehouse and the operating mechanism appear to be in good condition. The valve controls flow through a ten inch cast iron pipe which discharges into the downstream channel at a masonry headwall. The pipe and headwall were not observable due to ponding of water behind a concrete block flow monitoring weir built across the channel (Photo 7).

The upstream masonry retaining wall at the gatehouse appears to be structurally sound and has been resurfaced recently with concrete, however the concrete shows signs of minor cracking and spalling. The low level outlet approach channel was found to be at approximate elevation 1451 and about 4.5 feet wide. It appeared to be unobstructed.

d. Reservoir Area - There are no indications of slope instability along the reservoir edge near the dam or dikes and the reservoir is not subject to any excessive sedimentation or increases in runoff potential. There are no potential upstream hazard areas.

At a location between the two dikes, there is an approximately 250 foot long natural low ridge where overflow from the reservoir would occur at approximate elevation 1465.

e. Downstream Channel - The channel downstream of the dam is narrow with a sand and gravel bottom and passes through a densely forested, uninhabited reach to Reuben Hart Reservoir. The spillway discharge channel to the main stream channel appears inadaquate to carry high flows from over the spillway (Photo 8). However, overflow of the spillway channel or even partial blockage by fallen trees of either the stream channel or the spillway channel would not impair the operation of the dam.

3.2 EVALUATION

Based upon the visual inspection, the dam is assessed as being generally in good condition and the dikes in poor condition. The following features which could influence the future condition and/or stabiltiy of the dam and dikes were identified.

1. The seepage through the dikes could increase in flow, leading to erosion that could threaten the stabiltiy of the dikes. The same is true of the seepage through the dam, but it is of much lesser concern.

2. The tree and brush growth on the dikes could result in additional seepage along roots. Uprooting of any trees could cause damage to the slopes or crest of the dikes.

3. The steep downstream slopes of the dikes could lead to a problem with their stability although no immediate signs of instability were observed.

4. The inadaquate height of the dikes could lead to erosion by overtopping.

5. The lack of adequate upstream slope protection on the dikes could lead to erosion of the upstream slopes.

6. Deterioration of the dam spillway training wall could continue and worsen, as could erosion of the embankment slopes adjacent to the training wall.

SECTION 4: OPERATIONAL PROCEDURES

4.1 REGULATING PROCEDURES

North Pond acts as a storage reservoir for a distribution reservoir downstream and the single low level outlet at the dam is used to regulate flow downstream to Reuben Hart Reservoir as desired by the owner.

4.2 MAINTENANCE OF DAM

The dam is visited daily throughout the year and checked for trespassers. The grass on the dam is cut once or twice a year depending on the amount of growth. The Torrington Water Company performs a yearly maintenance project on one of its dams and the deteriorated spillway training wall is scheduled to be repaired during the summer of 1979.

The dikes at the northeast end of the reservoir are inspected for seepage by the owner once or twice a year, however in recent years, no maintenance was performed. According to the owner, during the summer of 1979 brush and tree clearing was begun.

4.3 MAINTENANCE OF OPERATING FACILITIES

The single tee-bar valve control in the gatehouse is maintained on an as-needed basis.

4.4 DESCRIPTION OF ANY FORMAL WARNING SYSTEM IN EFFECT

No formal warning system is in effect.

4.5 EVALUATION

The operation and maintenance procedures for the dam, though simple, are sufficient. The maintenance procedures for the dikes generally require improvement.

A formal program of operation, maintenance and inspection should be implemented, including documentation to provide complete records for future reference. Also a downstream warning system should be developed and implemented within the time-frame indicated in Section 7.1c. Remedial operation and maintenance recommendations are presented in Section 7.

SECTION 5: HYDRAULIC/HYDROLOGIC

5.1 EVALUATION OF FEATURES

a. General - The dam and dikes together comprise a high storage, low spillage type project, impounding approximately 2300 acre-feet of water. The approximately 185 acre reservoir comprises approximately 30 percent of the total drainage area.

The top of the dikes and a portion of natural ground at the northeast end of the reservoir are at an elevation approximately four feet below the top of the dam and only one foot above the spillway crest. In addition, there is an area of natural ground to the left of the spillway which is two feet lower than the top of the dam and greatly increases the effective spillway capacity at heads of three feet or more above the spillway crest (Appendix D-4 to D-6).

The outflow over the dikes and low ground significantly decreases the surcharge storage of the project and accordingly increases peak outflows under test flood conditions. Hydraulic analyses for the project were performed for presently existing conditions and for conditions with the dikes and natural ground at the northeast end of the reservoir raised to the top of dam elevation.

b. Design Data - No computations could be found for the original dam construction or later raising.

c. Experience Data - No information on serious problem situations arising at the dam were found and there are no records indicating that the dam has been overtopped.

d. Visual Observations - Although the area to the left of the spillway is heavily wooded as is the area around the downstream channel, there appears to be no serious danger of blockage of the spillway or discharge channel.

From visual observations of driftwood on the crest of the dikes and natural ground at the northeast end of the reservoir, it appears these were overtopped or nearly overtopped fairly recently.

e. Test Flood Analysis - The test flood for this high hazard intermediate size dam is equivalent to the "Probable Maximum Flood" (PMF).

Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March, 1973, peak inflow to the reservoir is 2300 cfs; peak outflow with the dikes in their present configuration is 1240 cfs with the dikes overtopped 0.8 feet; peak outflow with the dikes and low ground at the northeast end of the reservoir raised to the top of the dam is 640 cfs with 2.0 feet of freeboard (D-13).

The spillway capacity to the first point of overflow at the dikes and natural ground at the northeast end of the lake is 120 cfs which is approximately 10% of the routed test flood outflow under existing conditions. The spillway capacity to the top of the dam, if the dikes are raised and including the natural ground to the left of the spillway is 2100 cfs, which is approximately 330% of the routed test flood outflow (D-13).

For one-half PMF, under existing conditions, peak inflow is 1150 cfs; peak outflow is 400 cfs with the dikes overtopped 0.3 feet. For one-half PMF, with the dikes raised, peak inflow is 1150 cfs; peak outflow is 240 cfs with the dam and dikes maintaining 3.4 feet of freeboard (D-13).

f. Dam Failure Analysis - Utilizing the April 1978 "Rule of Thumb Guidance for Estimating Downstream Dam Failure Hydrographs", the peak failure outflow from a breach of the South Dike would be 5,900 cfs. Assuming no significant depth of water in the downstream channel prior to failure of the dike, the flood depth immediately downstream of the dike would be 6.6 feet and the approximate stage at the residences in the impact area along East Street near Hoover Pond would be 7 feet (D-18). The same impact area would be affected by a breach of the North Dike, but because of its greater height, the South Dike was analyzed as being representative of the hazard potential of North Pond.

Under PMF with the dikes raised to the top of the dam, the peak failure outflow from the dam breaching would be 9,600 cfs, and the flood depth immediately downstream of the dam would be eight feet. The effect of a breach of the dam on the potential impact area downstream of Reuben Hart Reservoir Dam would be minimal due to a diversion from Reuben Hart Reservoir to Hall Meadow Brook Reservoir (D-14 to D-16).

SECTION 6: STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observations

The visual inspection did not disclose any immediate stability problems in the dam or dikes. The overtopping potential of the dikes can, however lead to their failure by erosion.

b. Design and Construction Data

There is no design or construction data available for the dam or dikes, thus the assessment of stabiltiy is based solely on the visual inspection.

c. Operating Records

There are no records available of significance with respect to the stability of the dam or dikes.

d. Post Construction Changes - The dam was raised approximately four feet, or possibly even entirely reconstructed and the dikes constructed at some time post-dating the original dam construction, however nothing specific is known regarding this construction. Therefore, its affect on the structural stability of the dam could not be determined.

e. Seismic Stability - The dam is located in Seismic Zone 1 and according to the Recommended Guidelines, need not be evaluated for seismic stability.

SECTION 7: ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 DAM ASSESSMENT

a. Condition - Based upon the visual inspection of the site and its past performance, the dam appears to be in good condition and the dikes appear to be in poor condition. No evidence of structural instability was observed in the dam. However, the steepness of the downstream slopes of the dikes is cause for concern regarding potential stability problems. The dam spillway, training wall and appurtenances are generally in good condition, however there are several areas of concern in regard to the dikes. There is substantial seepage through the South Dike and apparent seepage through the North Dike. Both dikes are overgrown with trees and brush and lack adequate upstream slope protection.

Based upon "Preliminary Guidance for Estimating Maximum Probable Discharges", dated March, 1978, peak inflow to the reservoir is 2300 cfs; peak outflow with the dikes in their present configuration is 1240 cfs including 930 cfs outflow over the dikes which would be overtopped by 0.8 feet. Based upon the hydraulics computations, the spillway capacity to the first point of overflow of the dikes is 120 cfs which is approximately 10% of the routed test flood outflow.

b. Adequacy of Information - The information available is such that an assessment of the condition and stability of the dam must be based solely on visual inspection, past performance of the dam, and sound engineering judgement.

c. Urgency - It is recommended that the measures presented in Section 7.2 and 7.3 be implemented within one year of the owner's receipt of this report.

d. Need for Additional Information - There is a need for more information as recommended in Section 7.2.

7.2 RECOMMENDATIONS

It is recommended that further studies, pertaining to the following items, be undertaken by a registered professional engineer qualified in dam design and inspection.

1. Based upon the Phase 1 computations in Appendix D, the dikes and the low area of natural ground between these will be overtopped by the test flood. More sophisticated flood routing should be undertaken to refine the test flood figures. A study should be undertaken to determine the spillway adequacy and potential for overtopping. Recommendations regarding raising the dikes, based upon refined test flood figures, should be made by the engineer and implemented by the owner.

2. Recommendations should be developed for the rehabilitation or reconstruction of the dikes. The recommendations should be implemented by the owner and include provisions for removal of brush and trees, reshaping of the crest and downstream slopes and providing adequate upstream slope protection, as well as control or elimination of the seepage.

7.3 REMEDIAL MEASURES

a. Operation and Maintenance Procedures - The following measures should be undertaken by the owner within the time frame indicated in Section 7.2.c, and continued on a regular basis.

1. Round-the-clock surveillance should be provided during periods of unusually heavy precipitation and high project discharge. A downstream warning system should be developed to be used in case of an emergency at the dam or dikes.

2. A formal program of operation and maintenance procedures should be instituted and fully documented to provide accurate records for future reference.

3. A program of inspection of both the dam and dikes by a registered, professional engineer qualified in dam inspection should be instituted on an annual basis. The inspections should be comprehensive and include the operation of the low level outlet.

4. The upstream end of the spillway training wall should be repaired.

5. The seepage through the dikes should be closely monitored for increase in flow or sediment content. Monitoring should include photographic records for future reference.

6. Seepage through the dam should be checked periodically for increase in flows not related to changes in the reservoir level.

7.4 ALTERNATIVES

This study has identified no practical alternatives to the above recommendations.

APPENDIX A

INSPECTION CHECKLIST

VISUAL INSPECTION CHECK LIST
PARTY ORGANIZATION

PROJECT North Pond Dam
North Pond Dikes

DATE: 4/5/79, 6/6/79

TIME: —

WEATHER: 4/5 - Sunny, Cold; 6/6 - Sunny, Warm

W.S. ELEV. 1463 U.S. _____ DN.S

PARTY:	INITIALS:	DISCIPLINE:
1. Calvin Goldsmith (4/5)	CG	Cahn Engineers, Inc.
2. Peter Heynen	PH	" " "
3. Theodore Stevens	TS	" " "
4. Jay Costello (6/6)	JC	" " "
5. Gonzalo Castro	GC	Geotechnical Enbineers, Inc.
6. Richard Calhoun (4/5) & William Jones - Torrington Water Co.		

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Dam Embankment	All	
2.	North & South Dike Embankments	All	
3.	Intake Structure	All	
4.	Outlet Structure	All	
5.	Spillway	All	
6.			
7.			
8.			
9.			
10.			
11.			
12.			

PERIODIC INSPECTION CHECK LIST

PROJECT NORTH POND DAM DATE 4/5/79, 6/6/79

PROJECT FEATURE DAM EMBANKMENT BY ALL

AREA EVALUATED		CONDITION
DAM EMBANKMENT		
Crest Elevation		1469±
Current Pool Elevation		1463±
Maximum Impoundment to Date		N/A
Surface Cracks		NONE OBSERVED
Pavement Condition		N/A
Movement or Settlement of Crest		NONE OBSERVED
Lateral Movement		NONE OBSERVED
Vertical Alignment		TOO IRREGULAR TO JUDGE
Horizontal Alignment		
Condition at Abutment and at Concrete Structures		SLIGHT EROSION ON SLOPES ADJACENT TO SPILLWAY WINGWALL
Indications of Movement of Structural Items on Slopes		N/A
Trespassing on Slopes		MINOR
Sloughing or Erosion of Slopes or Abutments		NONE OBSERVED
Rock Slope Protection-Riprap Failures		NONE OBSERVED
Unusual Movement or Cracking at or Near Toes		NONE OBSERVED
Unusual Embankment or Downstream Seepage		TWO MINOR SEEPS AT TOE
Piping or Boils		NONE OBSERVED
Foundation Drainage Features		NONE KNOWN
Toe Drains		NONE KNOWN
Instrumentation System		NONE

PERIODIC INSPECTION CHECK LIST

PROJECT NORTH POND DIKES DATE 6/6/79

PROJECT FEATURE NORTH & SOUTH DIKE EMBANKMENTS BY ALL

AREA EVALUATED		CONDITION
DIKE EMBANKMENT		COMMENTS APPLY TO BOTH DIKES
Crest Elevation		1465±
Current Pool Elevation		1463±
Maximum Impoundment to Date		FROM DRIFTWOOD APPEAR TO HAVE BEEN NEARLY OVERTOPPED
Surface Cracks		NONE OBSERVED
Pavement Condition		N/A
Movement or Settlement of Crest		IRREGULAR CREST ELEVATION
Lateral Movement		NONE OBSERVED
Vertical Alignment		POOR - LOW AREAS ALONG CREST
Horizontal Alignment		TOO IRREGULAR TO JUDGE
Condition at Abutment and at Concrete Structures		N/A
Indications of Movement of Structural Items on Slopes		N/A
Sloughing or Erosion of Slopes or Abutments		EROSION ON D/S SLOPES
Rock Slope Protection-Riprap Failures		MARGINAL U/S SLOPE PROTECTION
Unusual Movement or Cracking at or Near Toes		N/A
Unusual Embankment or Downstream Seepage		NORTH DIKE - POSSIBLE SEEPAGE SOUTH DIKE - TWO SEEPS
Piping or Boils		NONE OBSERVED
Foundation Drainage Features		NONE KNOWN
Toe Drains		NONE KNOWN
Instrumentation System		N/A
Trespassing on Slopes		NONE OBSERVED

PERIODIC INSPECTION CHECK LIST

PROJECT NORTH POND DAM DATE 4/5/79, 6/6/79

PROJECT FEATURE INTAKE STRUCTURE BY ALL

AREA EVALUATED		CONDITION
OUTLET WORKS-INTAKE CHANNEL AND INTAKE STRUCTURE		
a) Approach Channel		APPROACH CHANNEL PROBED WITH SURVEY ROD
Slope Conditions		BOTTOM OF CHANNEL @ EL. 1451
Bottom Conditions		CHANNEL APPROX. 4.5' WIDE
Rock Slides or Falls		
Log Boom		
Debris		
Condition of Concrete Lining		
Drains or Weep Holes		
b) Intake Structure		
Condition of ~~Concrete~~ Masonry		GOOD
Stop Logs and Slots		NONE - MAY HAVE BEEN STOP LOGS IN PAST - IRON BAR HANGING FROM MASONRY RETAINING WALL
		WOOD GATEHOUSE HOUSES VALVE CONTROL

PERIODIC INSPECTION CHECK LIST

PROJECT NORTH POND DAM DATE 4/5/79, 6/6/79

PROJECT FEATURE OUTLET STRUCTURE BY JLL

AREA EVALUATED		CONDITION
OUTLET WORKS-OUTLET STRUCTURE AND OUTLET CHANNEL		
General Condition of ~~Concrete~~ Masonry		NOT OBSERVABLE
Rust or Staining		N/A
Spalling		N/A
Erosion or Cavitation		N/A
Visible Reinforcing		N/A
Any Seepage or Efflorescence		N/A
Condition at Joints		N/A
Drain Holes		N/A
Channel		
Loose Rock or Trees Overhanging Channel		CHANNEL PASSES THRU HEAVILY WOODED AREA
Condition of Discharge Channel		SAND AND GRAVEL
		NOTE: OUTLET HEADWALL NOT OBSERVABLE DUE TO PONDING OF WATER BEHIND TEMPORARY SEEPAGE MONITORING WEIR

PERIODIC INSPECTION CHECK LIST

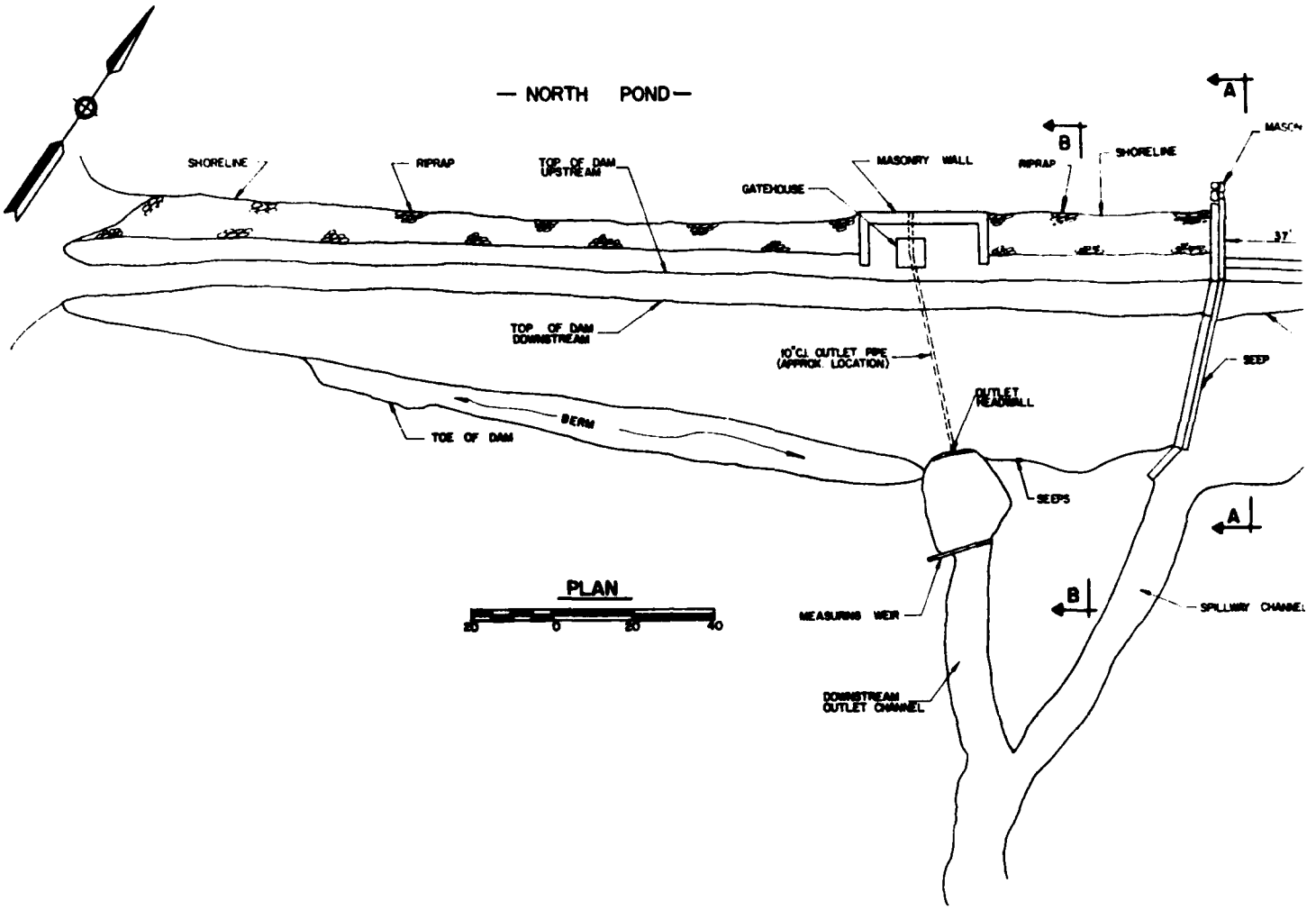
PROJECT NORTH FORK DAM DATE 4/5/79

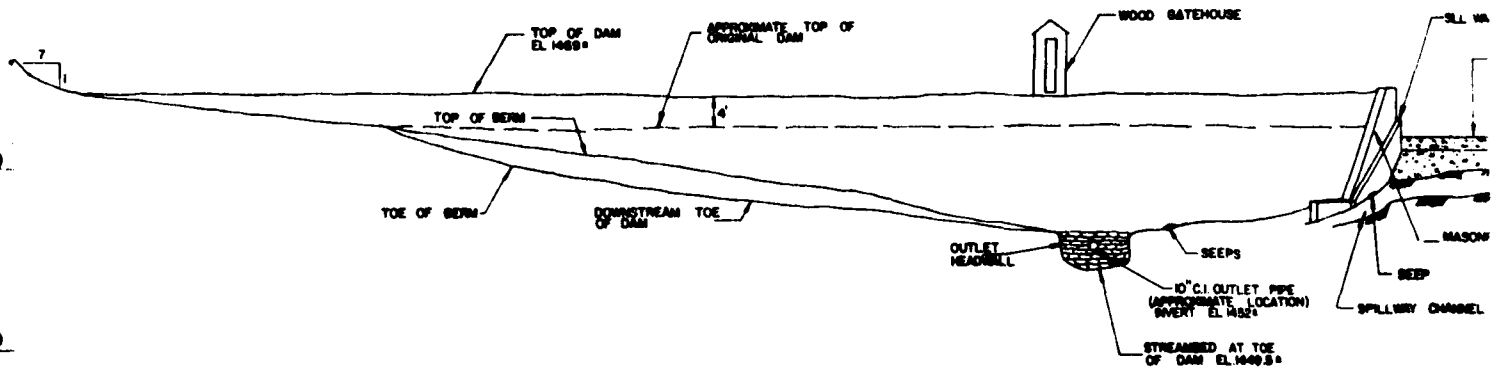
PROJECT FEATURE SPILLWAY BY ALL

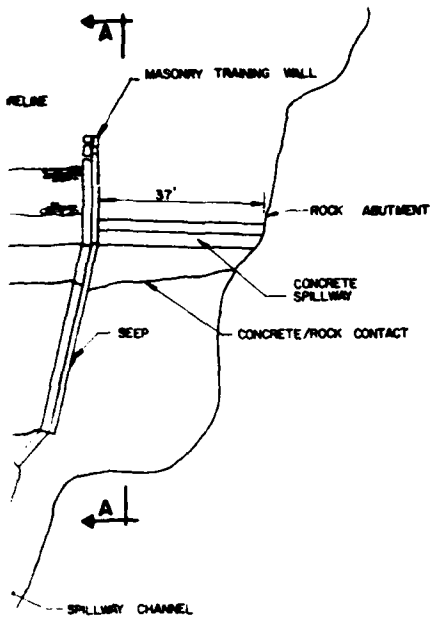
AREA EVALUATED	CONDITION
OUTLET WORKS-SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a) Approach Channel	
General Condition	GOOD
Loose Rock Overhanging Channel	NONE OBSERVED
Trees Overhanging Channel	NONE OBSERVED
Floor of Approach Channel	RIPRAP THEN 4' WIDE CONCRETE APPROACH SLAB
b) Weir and Training Walls	
General Condition of ~~Concrete~~ Masonry	FAIR - DETERIORATION AT U/S END
Rust or Staining	NONE OBSERVED
Spalling	N/A
Any Visible Reinforcing	N/A
Any Seepage or Efflorescence	SEEP AT BASE OF WALL
Drain Holes	NONE OBSERVED
c) Discharge Channel	
General Condition	DISCHARGES ONTO ROCK - NO DEFINITIVE CHANNEL
Loose Rock Overhanging Channel	NONE OBSERVED
Trees Overhanging Channel	YES - MANY BUT DO NOT POSE PROBLEM
Floor of Channel	ROCK
Other Obstructions	SMALL CHANNEL BACK TO NATURAL STREAM CHANNEL

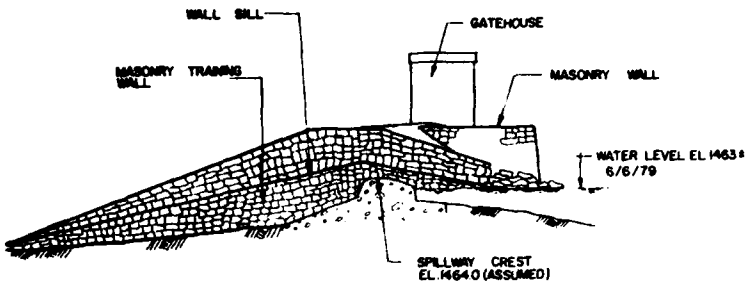
APPENDIX B

ENGINEERING DA"A AND CORRESPONDENCE

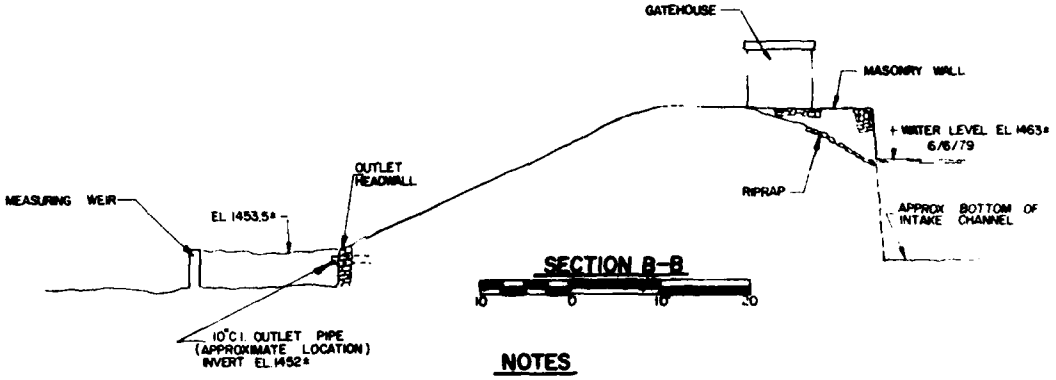

— NORTH POND —
A
B
SHORELINE
RIPRAP
TOP OF DAM UPSTREAM
GATEHOUSE
MASONRY WALL
RIPRAP
SHORELINE
MASON
37'
TOP OF DAM DOWNSTREAM
10"C.I. OUTLET PIPE (APPROX. LOCATION)
SEEP
OUTLET HEADWALL
BERM
TOE OF DAM
SEEPS
A
PLAN
B
SPILLWAY CHANNEL
MEASURING WEIR
DOWNSTREAM OUTLET CHANNEL
20 0 20 40


TOP OF DAM EL 1469.0
APPROXIMATE TOP OF ORIGINAL DAM
WOOD GATEHOUSE
SILL WA
TOP OF BERM
4'
TOE OF BERM
DOWNSTREAM TOE OF DAM
OUTLET HEADWALL
SEEPS
MASON
SEEP
10"C.I. OUTLET PIPE (APPROXIMATE LOCATION) INVERT EL 1452.0
SPILLWAY CHANNEL
STREAMBED AT TOE OF DAM EL 1449.5
ELEVATION
HORIZONTAL
VERTICAL
20 0 20 40
0 0 10 20





SECTION A-A

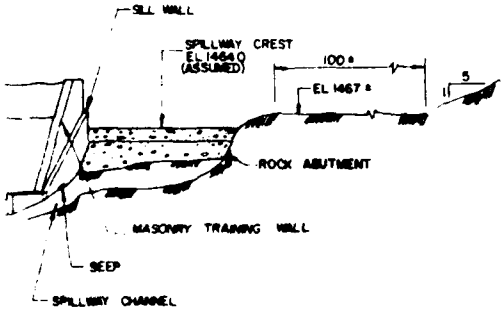


SECTION B-B

NOTES

1. THIS PLAN WAS COMPILED FROM A CAHN ENGINEERS PRELIMINARY SURVEY OF THE DAM DATED JUNE 6, 1979. DIMENSIONS SHOWN ARE APPROXIMATE. NOT ALL TOPOGRAPHIC AND/OR STRUCTURAL FEATURES ARE NECESSARILY IDENTIFIED.

3. NO ELEVATIONS WERE AVAILABLE FOR THE DAM, THEREFORE THE WATER SURFACE ELEVATION SHOWN ON THE NORFOLK U.S.G.S. QUADRANGLE MAP WAS ASSUMED TO BE THE ELEVATION OF THE SPILLWAY CREST. ALL OTHER ELEVATIONS SHOWN ARE REFERENCED TO THE ASSUMED SPILLWAY CREST ELEVATION.



2

CAHN ENGINEERS INC. WALLINGFORD, CONNECTICUT ENGINEER	U.S. ARMY ENGINEER DIV NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS

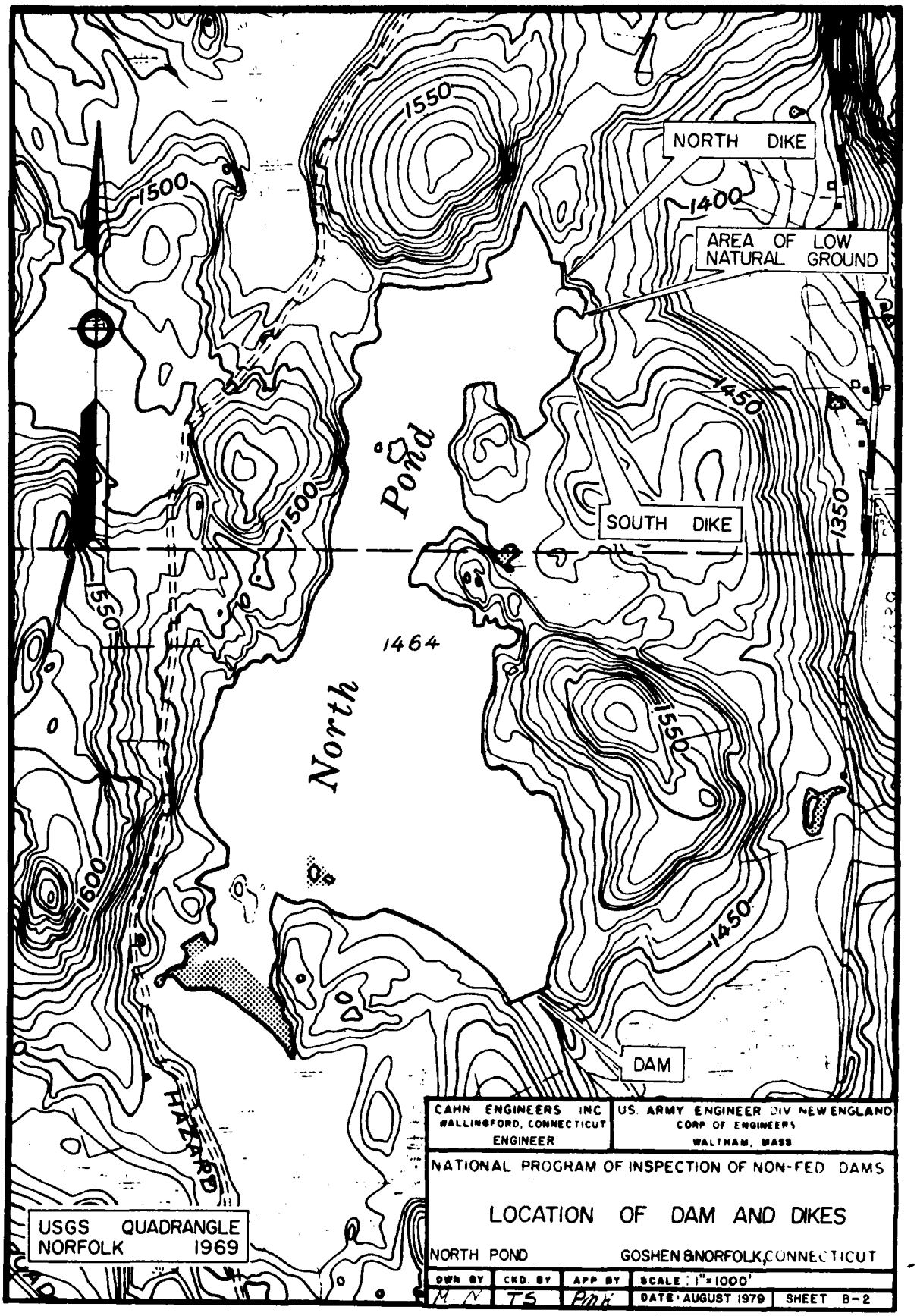
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

PLAN, ELEVATION & SECTIONS

NORTH POND DAM

HART BROOK GOSHEN, CONNECTICUT

DRAWN BY	CHECKED BY	APPROVED BY	SCALE AS NOTED	
M N	TS	PMH	DATE AUGUST 1979	SHEET 8


NORTH DIKE
AREA OF LOW NATURAL GROUND
SOUTH DIKE
DAM
North Pond
1464
1550
1500
1400
1450
1350
1600
HAZARD
USGS QUADRANGLE
NORFOLK 1969
CAHN ENGINEERS INC
WALLINGFORD, CONNECTICUT
ENGINEER
US. ARMY ENGINEER DIV NEW ENGLAND
CORP OF ENGINEERS
WALTHAM, MASS
NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS
LOCATION OF DAM AND DIKES
NORTH POND
GOSHEN & NORFOLK, CONNECTICUT
DWN BY
CKD. BY
APP BY
SCALE: 1"=1000'
M.N
T.S
DATE: AUGUST 1979
SHEET B-2

No. [illegible]

Inventoried By JS

Date

WATER RESOURCES COMMISSION
SUPERVISION OF DAMS
INVENTORY DATA

CT-450

Name of Dam or Pond [illegible]

Code No. N38.1 WBr 6.05 H 9.6

Nearest Street Location East Street North

Town Goshen

U.S.G.S. Quad. [illegible]

Name of Stream [illegible]

Owner Torrington

Address 110 Prospect St Torrington

LONG-73 13.1

LAT-41-54.1

02/7/93

Pond Used For [illegible]

Dimensions of Pond: Width _____ Length _____ Area 232.

Total Length of Dam 30'+ Length of Spillway 30'+

Location of Spillway [illegible]

Height of Pond Above Stream Bed [illegible]

Height of Embankment Above Spillway [illegible]

Type of Spillway Construction [illegible]

Type of Dike Construction [illegible]

Downstream Conditions [illegible]

Summary of File Data

Remarks

Would Failure Cause Damage? YES Class B

APPENDIX C

DETAIL PHOTOGRAPHS

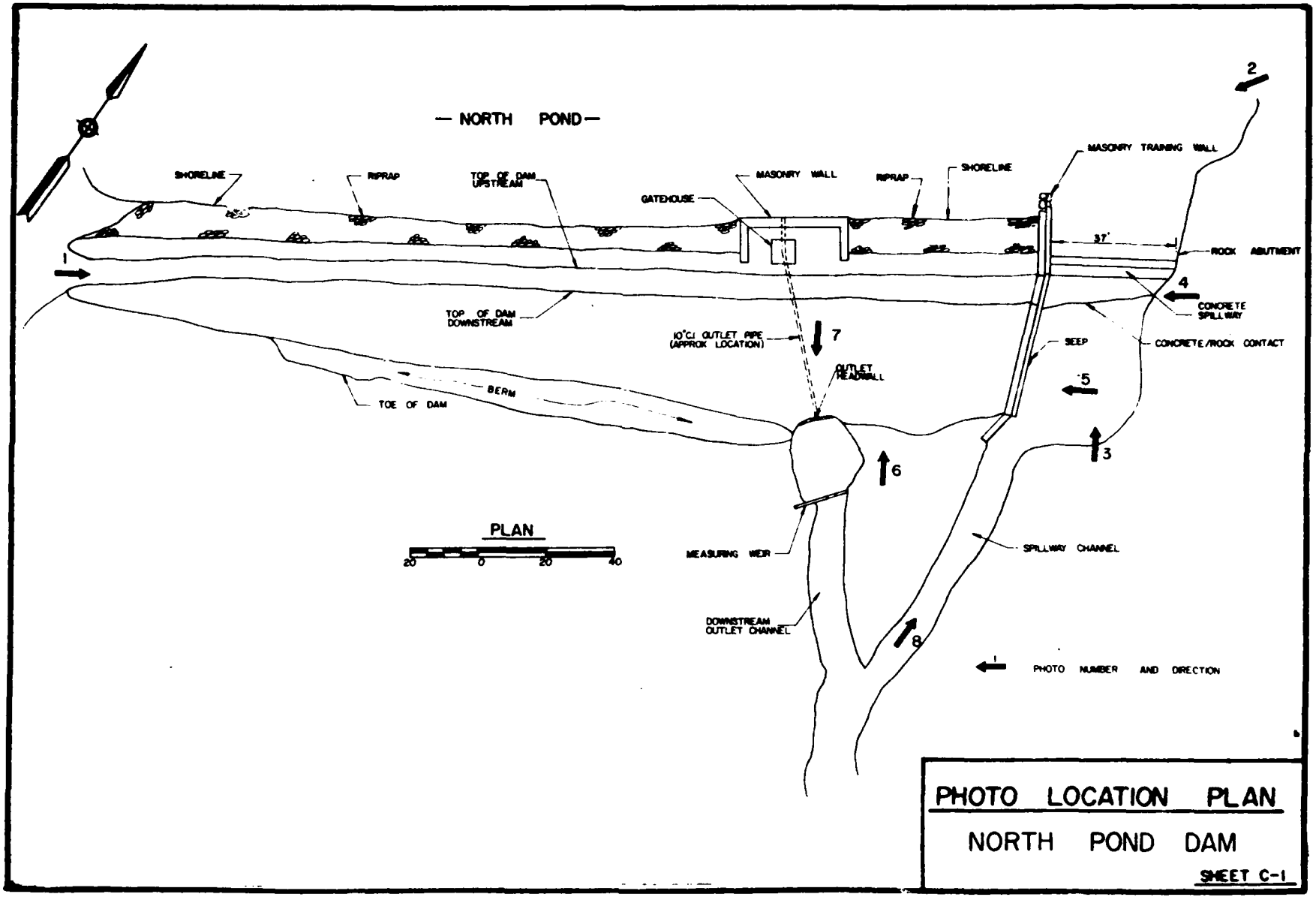


PHOTO LOCATION PLAN

NORTH POND DAM

SHEET C-1

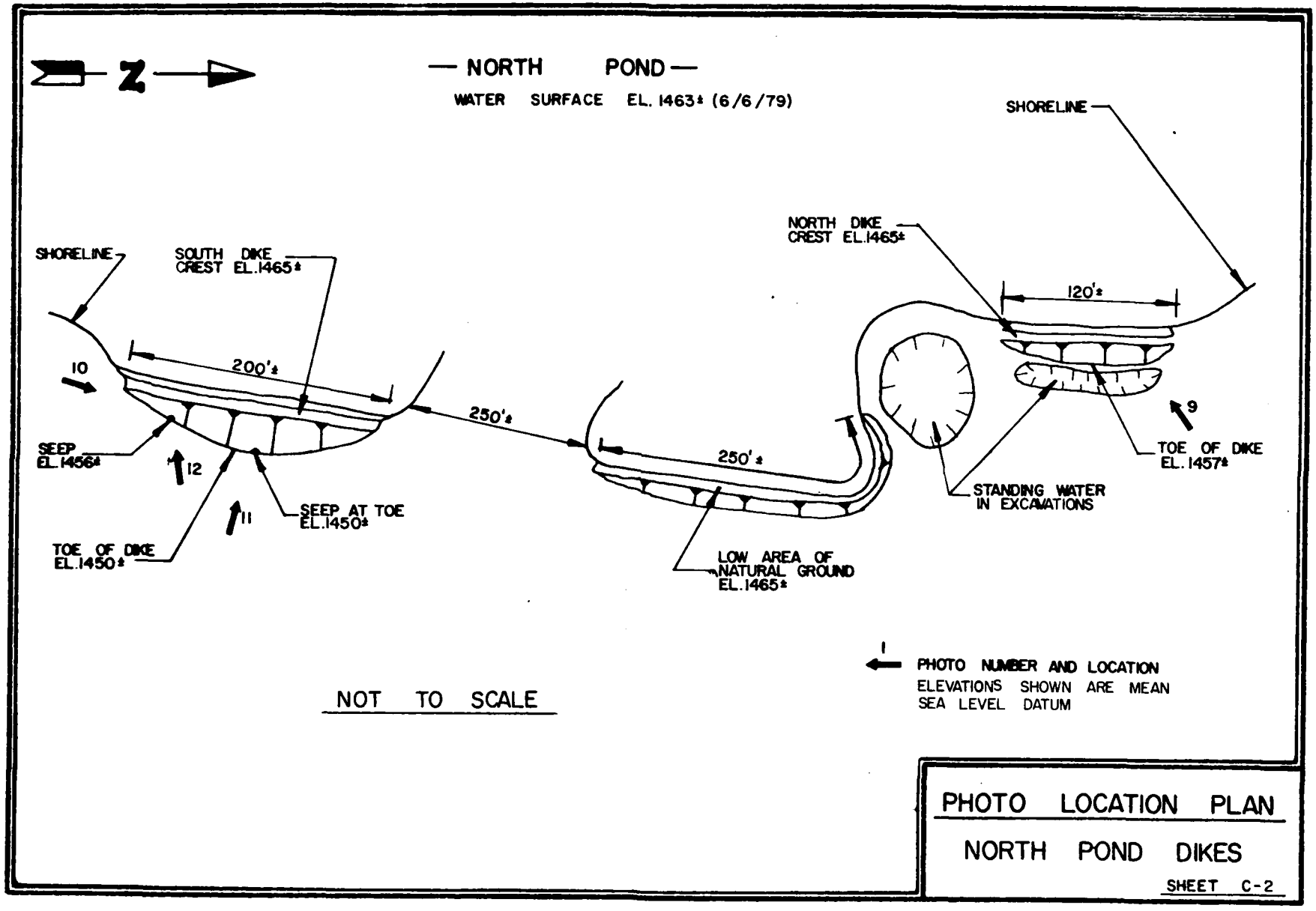


PHOTO LOCATION PLAN

NORTH POND DIKES

SHEET C-2

Photo 1 - General view of crest and downstream slope from right end (April 1979)

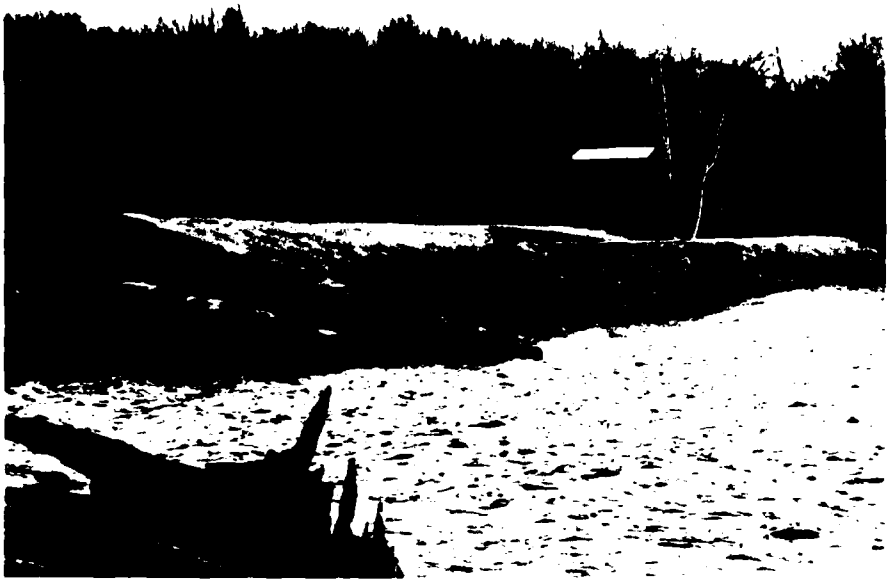


Photo 2 - General view of upstream slope from left end. Note deterioration of upstream end of spillway training wall (April 1979)

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	NORTH POND DAM HART BROOK GOSHEN, CT.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE#27 595 KB DATE Aug 79 PAGE C-1

Photo 3 - Concrete spillway founded on rock. Note low rock abutment at right of photo (April, 1979)

Photo 4 Seepage at contact between concrete spillway and bedrock (April 1979).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	NORTH POND DAM HART BROOK GOSHEN, CONNECTICUT
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE# 27 595 KB DATE Aug '79 PAGE C-2

Photo 5 - Seepage at base of spillway training wall (June 1979).

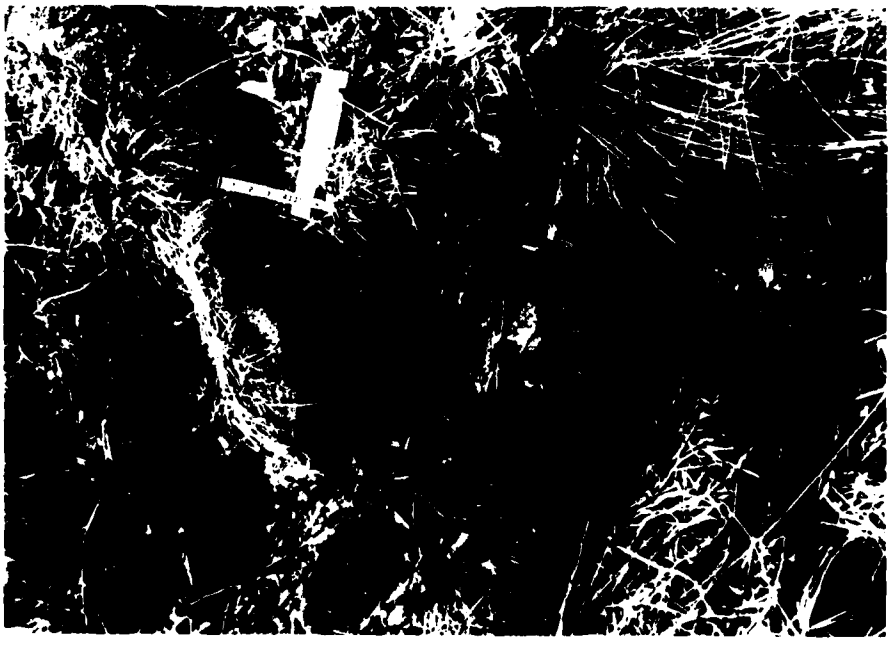


Photo 6 - Seep at toe of dam near low level outlet headwall (April 1979).

Photo 7 - Flow measurement weir and downstream channel (April 1979)

Photo 8 - Spillway discharge channel (April 1979)

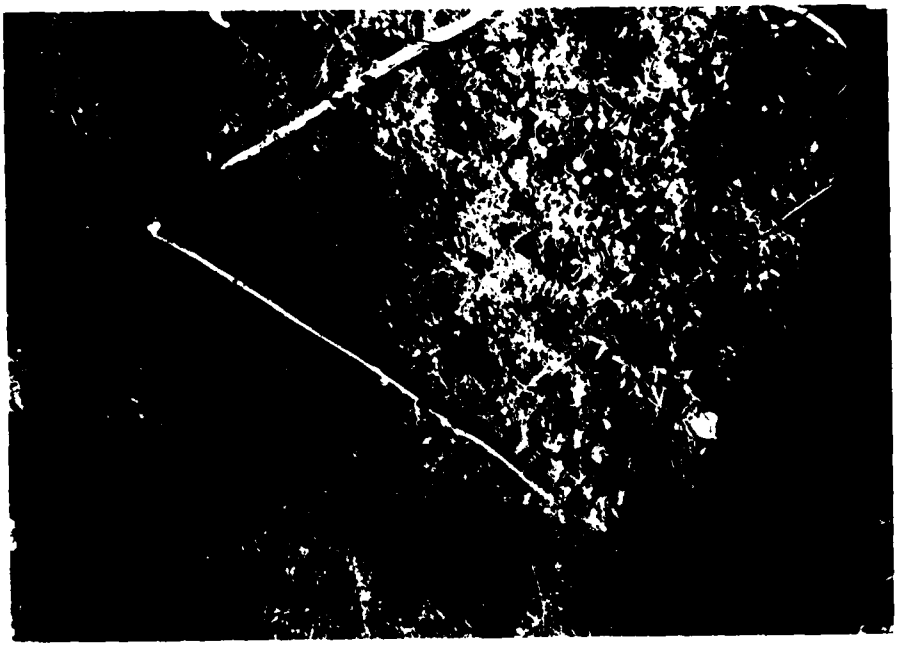


Photo 9 - Downstream slope of North Dike and standing water at toe (June 1979).

Photo 10- Downstream slope of South Dike. Note two pools of rust colored seepage water at toe (June 1979).

US ARMY ENGINEER DIV. NEW ENGLAND CORPS OF ENGINEERS WALTHAM, MASS.	NATIONAL PROGRAM OF	NORTH POND DIKES TR-HALL MEADOW BROOK NORFOLK, CT.
CAHN ENGINEERS INC. WALLINGFORD, CONN. ENGINEER	INSPECTION OF NON-FED. DAMS	CE# 27 595 KB DATE Aug 79 PAGE C-5

Photo 11 - Seep at center toe of South Dike (June 1979)

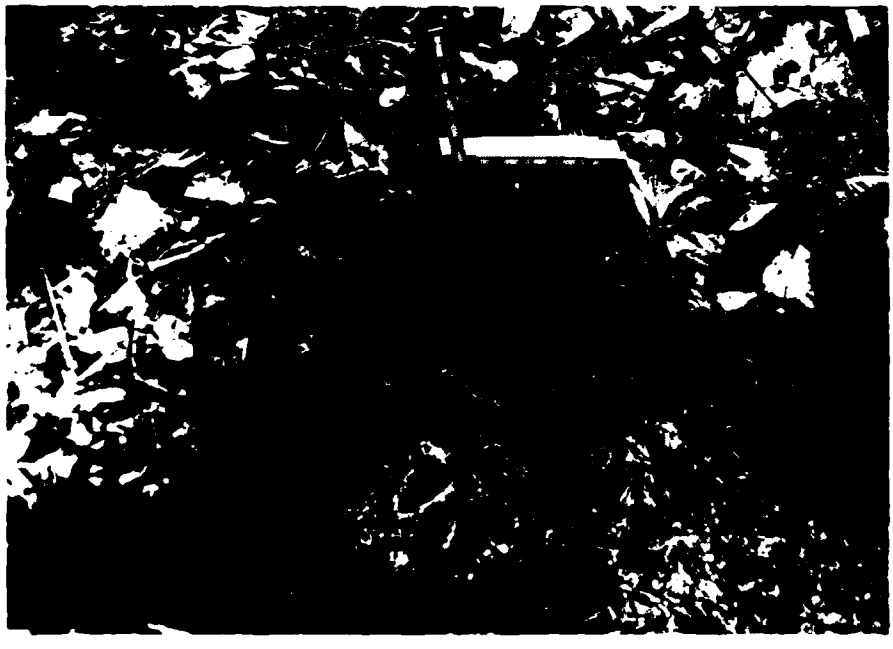
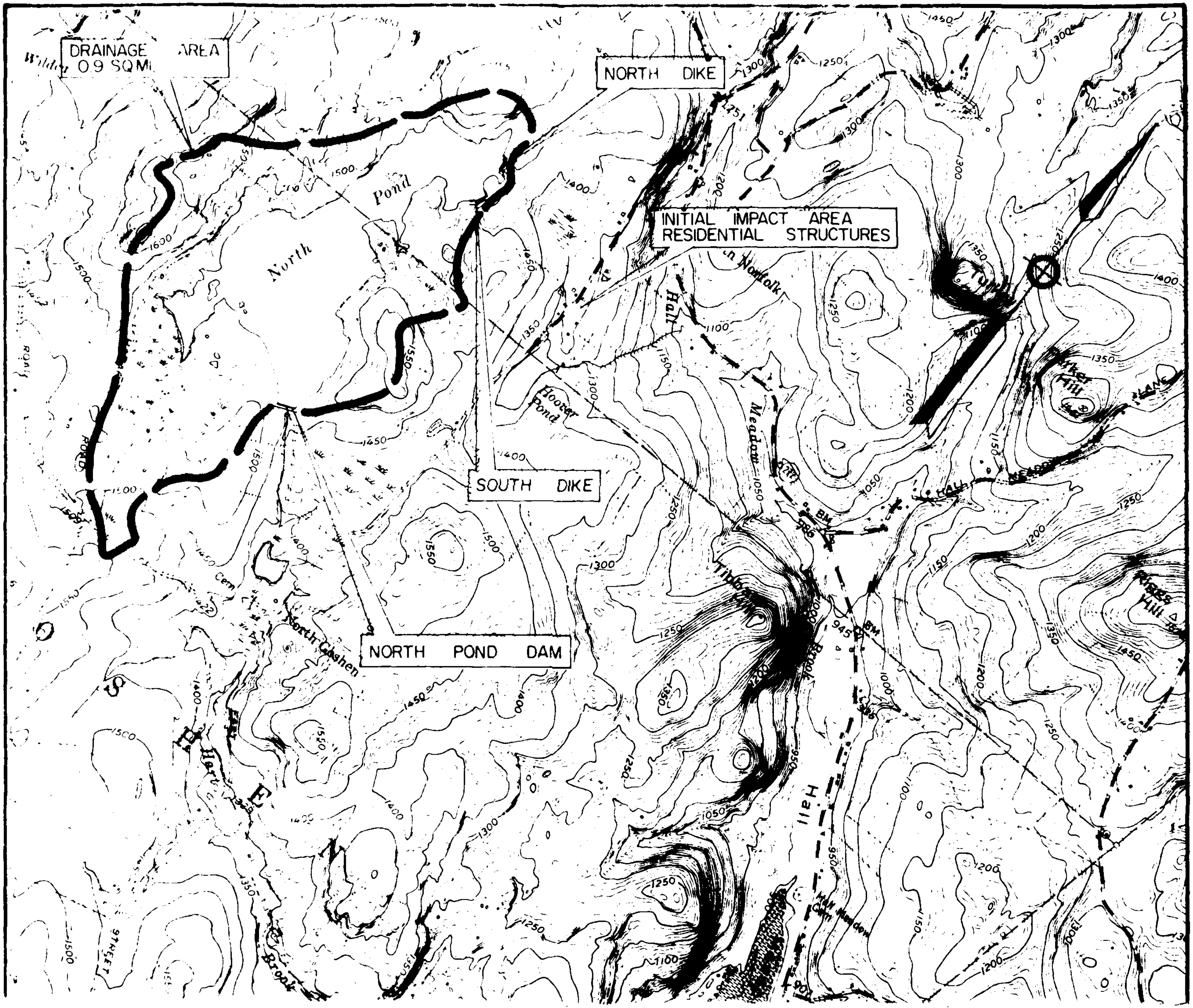
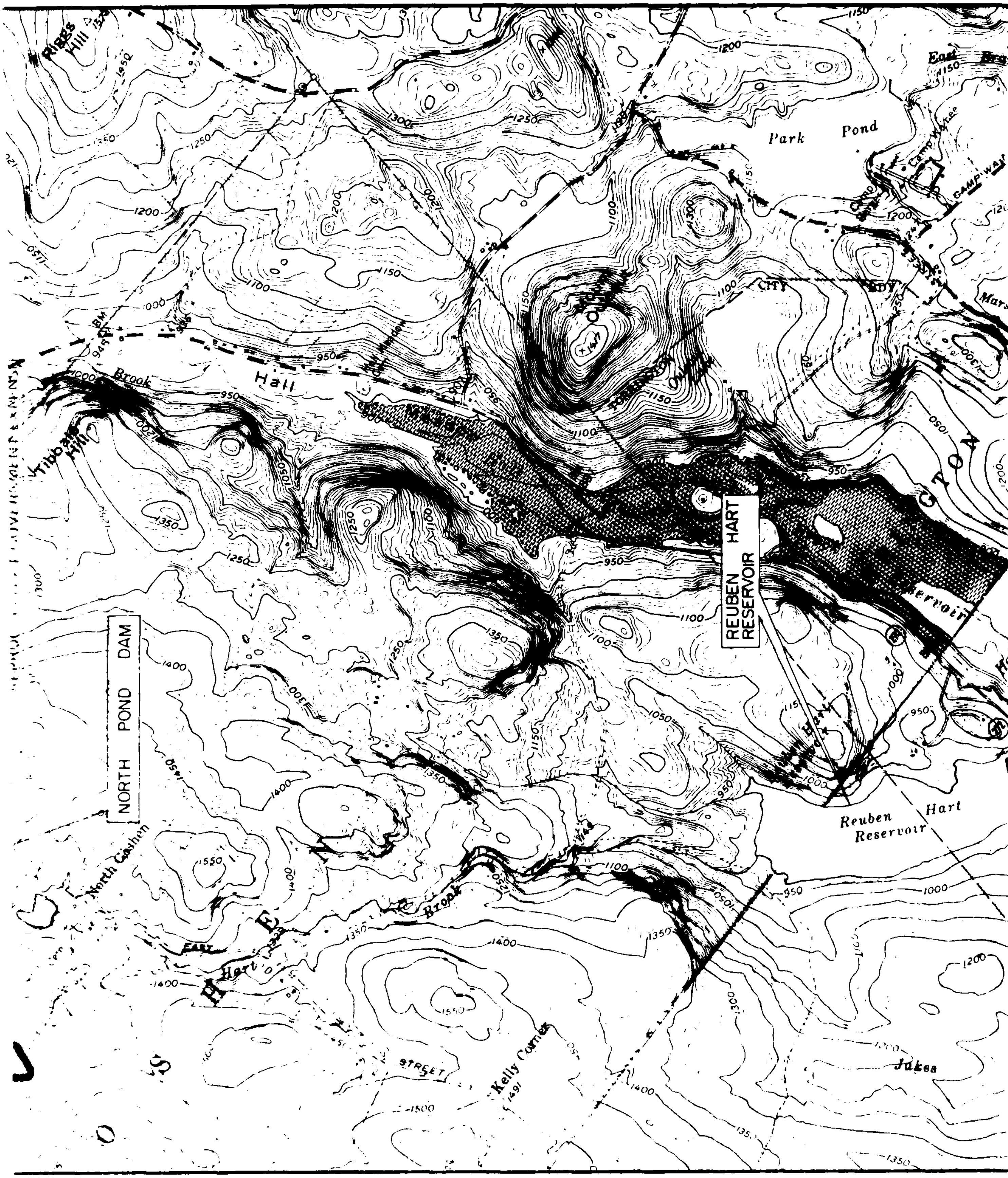


Photo 12 - Seep at right toe of South Dike (June 1979)

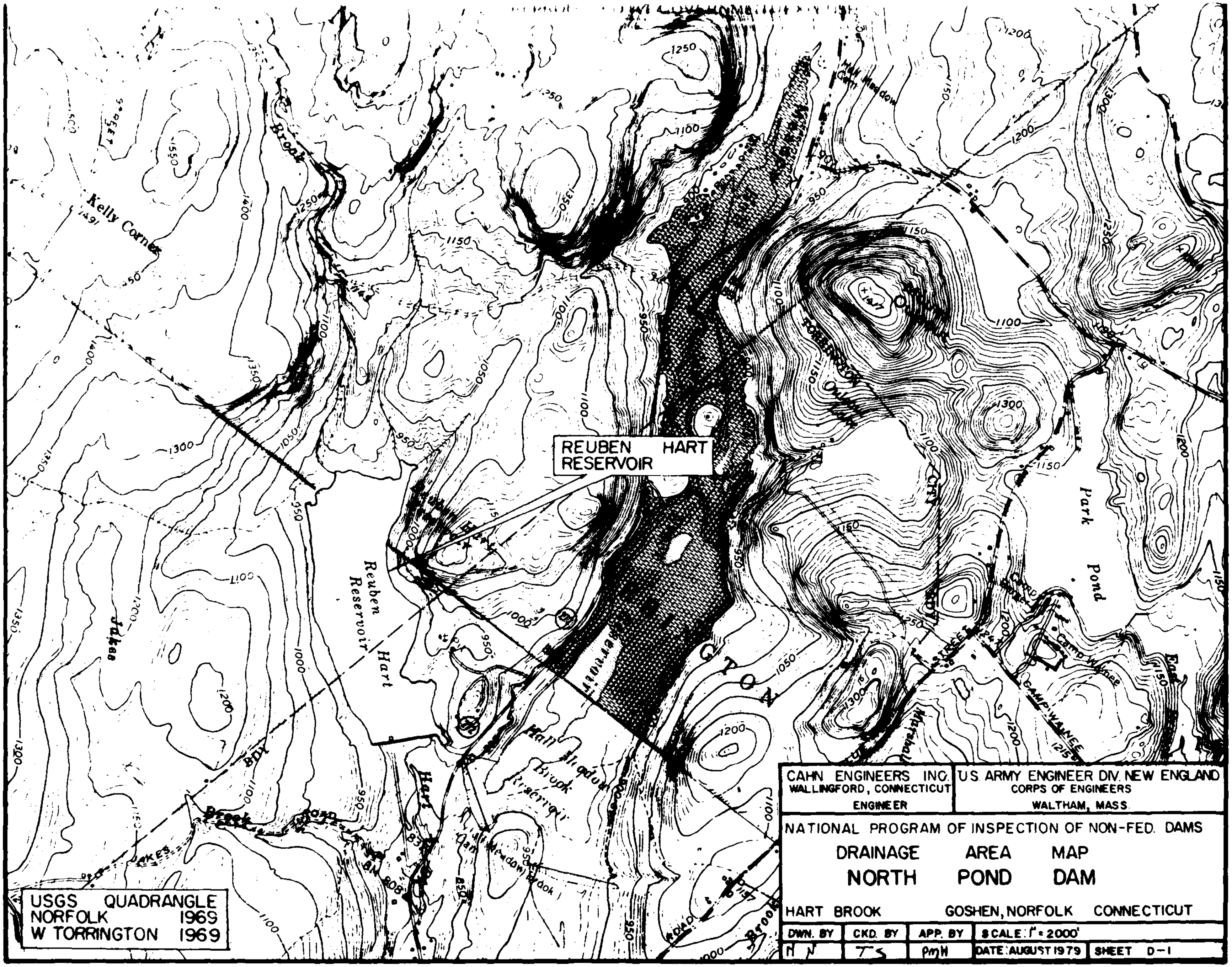
APPENDIX D

HYDRAULICS/HYDROLOGIC COMPUTATIONS


DRAINAGE AREA
0.9 SQ MI
NORTH DIKE
INITIAL IMPACT AREA
RESIDENTIAL STRUCTURES
SOUTH DIKE
NORTH POND DAM
North Pond
Hoover Pond
Meadow
Hall
Brook
North Goshen


NORTH POND DAM
REUBEN HART RESERVOIR
Park Pond
Hall
Brook
Reuben Hart Reservoir
North Goshen
Kelly Corner
STREET
Jukes

2


REUBEN HART RESERVOIR
Park Pond
Reuben Hart Reservoir
Kelly Corner
Jukes
Hall Meadow Brook Reservoir
Hart Brook
CAMP WA-NEE
USGS QUADRANGLE
NORFOLK 1969
W TORRINGTON 1969
CAHN ENGINEERS INC.
WALLINGFORD, CONNECTICUT
ENGINEER
US ARMY ENGINEER DIV. NEW ENGLAND
CORPS OF ENGINEERS
WALTHAM, MASS.
NATIONAL PROGRAM OF INSPECTION OF NON-FED. DAMS
DRAINAGE AREA MAP
NORTH POND DAM
HART BROOK
GOSHEN, NORFOLK CONNECTICUT
DWN. BY
CKD. BY
APP. BY
SCALE: 1" = 2000'
DATE: AUGUST 1979
SHEET D-1

HYDROLOGIC/HYDRAULIC INSPECTION

NORTH POND DAM, GOSHEN/NORFOLK, CT.

I) PERFORMANCE AT TEST FLOOD CONDITIONS:

1) MAXIMUM PROBABLE FLOOD

a) WATERSHED CLASSIFIED AS "ROLLING"

b) WATERSHED AREA: D.A. $\simeq$ 0.94 sq mi

NOTE: USGS, HARTFORD OFFICE: D.A. = 1.93 sq mi; NED-ACE HALL MEADOW BROOK-DAM & RESERVOIR-DES. MEMO NO 1, MAY 1960, D.A. = 1.0 sq mi; REUBEN HART DAM, PHASE I INSP. REPORT, D.A. = 0.94 sq mi; C.E., D.A. = 0.94 sq mi

c) FROM NED-ACE "PRELIMINARY GUIDANCE FOR ESTIMATING MAX. PROBABLE DISCHARGES" GUIDE CURVE FOR PMF - PEAK FLOW RATES EXTRAPOLATION TO D.A. < 2 sq mi,

$$PMF \simeq 2400 \text{ cfs/sq mi}$$

d) PEAK INFLOW: $PMF \simeq 2400 \times 0.94 \simeq 2300$ cfs

2) SPILLWAY DESIGN FLOOD (SDF)

a) CLASSIFICATION OF DAM ACCORDING TO NED-ACE RECOMMENDED GUIDELINES:

i) SIZE: * STORAGE (MAX) $\simeq$ 3500 ACFT (1000 < S < 50000 ACFT)
HEIGHT $\simeq$ 19.5' (DAM) (6 < H < 25')
(DIKES (±) 15' AND 8' HIGH)

D-1

NOTE: STORAGE/HEIGHT REFER TO DAM. MAX. STORAGE UNDER EXISTING CONDITIONS IS HOWEVER, ONLY S (MAX) $\simeq$ 2500 ACFT, TO TOP OF LOW DIKES AT THE NE SHORE OF THE LAKE (EL. 1465' MSL).

NORTH POND DAM

2.2.1-Cont'd) CLASSIFICATION - SIZE

STORAGE: FROM THE TORRINGTON WATER CO., STORAGE "TRADITIONALLY" BELIEVED TO BE S_{TC}=750 MG = 2300 AC-FT TO FLOW LINE; C.E. ROUGH ESTIMATE: 0.6AH ≅ 2100 AC FT ∴ THE T.W.CO. FIGURE FOR S_{TC} IS ASSUMED SUBSTANTIALLY CORRECT. AREA OF LAKE AT FLOWLINE (EL. 1464' MSL): A ≅ 185 AC (CE) (U.S.G.S., A=182 AC; REUBEN HART DAM PH. I INSPECTION, A ≅ 195 AC); CE: AREA AT EL. 1470' MSL: A ≅ 290 AC ∴ $\bar{A}$ ≅ 237 AC ; ∴ MAX. STORAGE: a) TO TOP OF DAM (EL. 1469' MSL): S_M ≅ 3500 AC-FT; b) TO TOP OF DIKES (EL. 1465' MSL): S_M ≅ 2500 AC-FT. (REUBEN HART DAM - PH. I. INSPECTION SHOWS SURCHARGE STORAGE TO TOP OF DAM: ΔS = 1160 AC, OK).

HEIGHT: FROM C.E. SURVEY / FIELD OBSERVATIONS: a) AT DAM: NATURAL STREAM BED D/S FROM DAM IS (±) 19.5' BELOW TOP OF DAM; b) AT DIKES: TOP OF DIKES AND LOW SADDLE AT N.E. END OF LAKE (EL. 1465' MSL) IS 4' LOWER THAN DAM.; THE NORTH DIKE IS (±) 8' HIGH AND, THE SOUTH DIKE IS (±) 15' HIGH (C.E. SURVEY ON 6/6/79).

(ii) HAZARD POTENTIAL: THE DAM IS LOCATED ON HART BROOK (±) 3 MI D/S FROM REUBEN HART RESERVOIR. THIS REACH OF THE STREAM IS UNINHABITED AT PRESENT. D/S FROM REUBEN HART RES., HOWEVER, THERE ARE SEVERAL LOW HOUSES WHICH UPON FAILURE OF NORTH POND DAM MAY BE AFFECTED BY THE OVERFLOW FROM REUBEN HART IN EXCESS OF THE FLOW DIVERTED FROM THIS RESERVOIR TO HALLMEADOW BROOK RESERVOIR.

FAILURE OF THE DIKES AT THE N.E. OF NORTH POND MAY AFFECT LOW HOUSING LOCATED (±) 2000' D/S FROM THE DIKES ALONG EAST STREET (RTE No. 272) NEAR HOOVER POND.

*NOTE: MSL ELEVATIONS FROM THE ASSUMPTION OF SPILLWAY CREST ELEV. ≅ EL. 1464' MSL SHOWN AS POND W.S ELEV. ON USGS NORFOLK, CONN. QUADRANGLE SHEET, 1956, PHOTOREV. 1969.

NORTH POND DAM

2-Cont'd) SPILLWAY DESIGN FLOOD

iii) CLASSIFICATION:

SIZE: INTERMEDIATE

HAZARD: HIGH

b) SDF = PMF = 2300 CFS ½ PMF = 1150 CFS

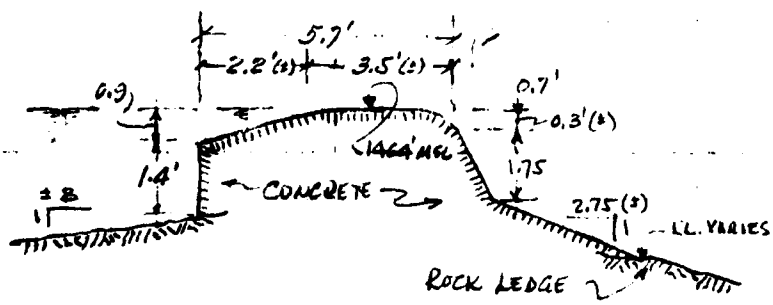
3) SURCHARGE AT PEAK INFLOWS:

a) PEAK INFLOW: Q_{P_1} = 2300 CFS Q'_{P_1} = ½ PMF = 1150 CFS

b) SPILLWAY (OUTFLOW) RATING CURVE

i) SPILLWAY

THE SPILLWAY IS ESSENTIALLY A BROAD CRESTED SILL (±) 2.5' HIGH AND 5.7' BROAD (OVERALL DIMENSIONS - SEE SKETCH). THE CREST IS (±) 37' LONG FROM THE STONE WALL AGAINST THE DAM EARTH EMBANKMENT AT THE RIGHT TO A NATURAL ROCK LEDGE AT THE LEFT. (SEE SKETCH P. D-4) THE CREST IS AT (±) EL. 1464' MSL (SEE NOTE P. D-2).

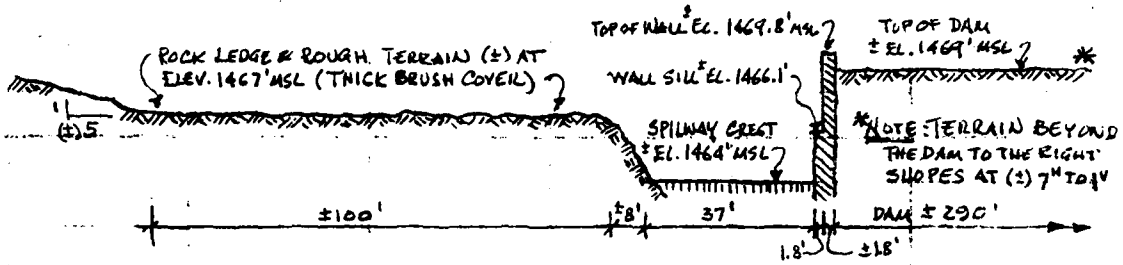


SPILLWAY TYPICAL CROSS SECTION

NOTE: DIMENSIONS FROM C.E. FIELD INSP. ON 4/5/79 AND SURVEY ON 6/6/79.

NORTH POND DAM

3.b - Cont'd) OUTFLOW RATING CURVE



PROFILE ALONG THE SPILLWAY AND ADJACENT TERRAIN TO THE LEFT

∴ ASSUME SPILLWAY DISCHARGE COEFFICIENT: $C = 3.3$

USING THE CREST ELEVATION AS DATUM (ELEV. 1464' MSL) THE SPILLWAY DISCHARGE IS APPROXIMATED BY:

$$Q_s' = 120\, H^{3/2} \qquad (C = 3.3,\ L = 37')$$

THE LEFT SIDE (BANK) OF THE SPILLWAY ADDS SOME CAPACITY TO THE SPILLWAY, SPECIALLY FOR HEADS $H > 3'$; ADDITIONAL CAPACITY ALTHOUGH NEGLIGEABLE, ALSO IS GIVEN AT THE RIGHT, BY THE WALL SILL FOR HEADS $H > 2.1'$. THE CORRESPONDING FLOWS OF THESE PORTIONS OF OVERFLOW SECTION THAT WILL ADD TO THE CAPACITY OF THE SPILLWAY WITHOUT IMPAIRING THE DAM, CAN BE APPROXIMATED AS FOLLOWS (ASSUMING $C = 2.0$ FOR THE ROUGH TERRAIN W/THICK BRUSH):

1') LEFT (SLOPING) SIDE OF SPILLWAY (ASSUMING AN EQUIVALENT LENGTH FOR HEADS $H \leq 3'$):

$$(L_L')_1 = \tfrac{2}{3}\left(\tfrac{8}{3}\right) H \;\therefore\; (Q_L')_1^{*} = 3.6\, H^{5/2};\ (H \leq 3) \quad (C = 2.0)$$

$$(L_L'')_1 = 8' \;\therefore\; (Q_L'')_1^{*} = 16\,(H - 0.7)^{3/2};\ (H > 3)$$ *ADJUSTED (SEE P.D-5)

4-0

NORTH POND DAM

3,b-Cont'd) OUTFLOW RATING CURVE

2') FLAT PORTION OF TERRAIN TO THE LEFT OF SPILLWAY:

$$(L_L)_2 \doteq 100' \quad \therefore \quad (Q_L)_2 = 200(H-3)^{3/2} \quad (C \doteq 2.0)$$

3') SLOPING TERRAIN BEYOND, TO THE LEFT:

$$(L_L')_3 \doteq \tfrac{2}{3}(5)(H-3) \quad \therefore \quad (Q_L')_3 \doteq 6.7(H-3)^{5/2}$$

NOTE: THE HEAD IN THE FLOW FORMULA FOR CONSTANT LENGTH $(Q_L'')_2$, BEYOND THE SLOPING PORTION OF THE SPILLWAY (see (1') P.D-3), HAS BEEN ADJUSTED AS TO ACCOUNT FOR THE SLOPE AT THE BASE, TO HAVE APPROXIMATELY THE SAME RESULT AS WITH THE FORMULA $(Q_L')^*$ FOR THE TRANSITION DEPTH ($H = 3'$).

THE ADDITIONAL CAPACITY FOR $H > 2.1'$ PRODUCED AT THE RIGHT BY THE WALL SILL, IS NEGLECTED.

ii) EXTENSION OF THE RATING CURVE FOR SURCHARGE HEADS OVERTOPPING THE DIKES TO THE NORTHEAST OF THE LAKE.

OVERTOPPING OF THE DIKES WHICH ARE ABOUT 1' HIGHER* THAN THE SPILLWAY CREST, WILL OCCUR EARLIER THAN AT ANY OTHER LOCATION, INCLUDING THE DAM.

THEREFORE, ALTHOUGH THIS OUTFLOW DOES DRAIN TO OTHER WATERSHED (HALL MEADOW BROOK) IT WILL FORM PART OF THE TOTAL OUTFLOW

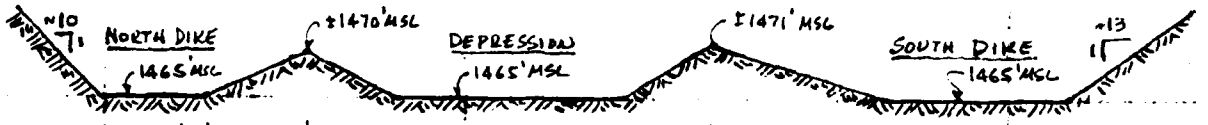
*C.E. SURVEY ON 6/6/79

NORTH POND DAM

3,b-C.4'd) OUTFLOW RATING CURVE

RATING CURVE OF NORTH POND FOR THE DETERMINATION OF THE SURCHARGE AT TEST FLOOD CONDITIONS. HOWEVER, A PARALLEL COMPUTATION WILL BE DONE ASSUMING NO OVERFLOW AT THESE LOW AREAS, TO DETERMINE THE SURCHARGE IN CASE THEY ARE RAISED TO THE TOP ELEVATION OF THE MAIN DAM.

THE DIKES ARE DENSELY WOODED AND COVERED BY BRUSH AND DEBRIS. THE TOP OF THE DIKES IS (±) AT ELEV.* 1465' (MSL) OR, (±) 1' ABOVE THE SPILLWAY CREST AT THE MAIN DAM. A DEPRESSION (±) 250' LONG BETWEEN TWO KNOLLS SEPARATING THE DIKES ALSO IS AT (±) EL. 1465' MSL, AS SHOWN IN THE FOLLOWING PROFILE:



PROFILE ALONG NORTH POND DIKES ON THE NE. SHORE.

∴ ASSUME C = 2.0 FOR THE OVERFLOW AT THE DIKES, DEPRESSION AND SIDE SLOPES.

ALSO, ASSUMING EQUIVALENT LENGTHS FOR THE PORTIONS OF SLOPING TERRAIN AND THE SPILLWAY CREST ELEVATION (EL. 1464' MSL) AS DATUM THE N.E. OVERFLOW CAN BE APPROXIMATED BY THE FOLLOWING SET OF EQUATIONS:

*C.E. SURVEY ON 6/6/79

NORTH POND DAM

3.b - Cont'd) OUTFLOW RATING CURVE

1') DIKES AND DEPRESSION OVERFLOW:

$$L_{DK} = 120 + 250 + 200 = 570' \quad \therefore (Q_{DK})_1 \cong 1100(H-1)^{3/2}$$

2') EXTREME LEFT & RIGHT SLOPING TERRAIN (W/EQUIV. LENGTH):

$$(L'_{DK})_2 = \frac{2}{3}(10+13)(H-1) \quad \therefore \quad (Q'_{DK})_2 \cong 31(H-1)^{5/2}$$

3') SLOPING TERRAIN OF LEFT (NORTH) KNOLL:

$$\begin{cases} (L'_{DK})_3^* = \frac{2}{3}\left(\frac{200}{5}\right)(H-1) \quad \therefore (Q'_{DK})_3^* \cong 53(H-1)^{5/2} & \text{FOR } (H \le 6) \\ (L''_{DK})_3^* = 200' \quad \therefore (Q''_{DK})_3^* \cong 400(H-2.2)^{3/2} & \text{FOR } (H > 6) \end{cases}$$

(SEE NOTE ON P. D-5, SECT. 3,b,i FOR A SIMILAR CASE)

4') SLOPING TERRAIN OF RIGHT (SOUTH) KNOLL:

$$\begin{cases} (L'_{DK})_4^* = \frac{2}{3}\left(\frac{300}{6}\right)(H-1) \quad \therefore (Q'_{DK})_4^* \cong 67(H-1)^{5/2} & \text{FOR } (H \le 7) \\ (L''_{DK})_4^* = 300' \quad \therefore (Q''_{DK})_4^* \cong 600(H-2.4)^{3/2} & \text{FOR } (H > 7) \end{cases}$$

(SEE NOTE ON P. D-5, SECT. 3,b,i FOR A SIMILAR CASE)

THEREFORE, THE NE OVERFLOW CAN BE APPROXIMATED BY:

$$Q_{DK}^* \cong 1100(H-1)^{3/2} + 150(H-1)^{5/2} \quad \text{FOR } H \le 6'$$

$\hat{=} 31 + 53 + 67 = 151$, say 150

OR, WITH THE PROPER ADJUSTMENTS AND/OR MODIFICATIONS FROM EQUATIONS (3') AND (4') FOR $H > 6'$

NORTH POND DAM

3.b - (Cont'd) OUTFLOW RATING CURVE

(ii) EXTENSION OF THE RATING CURVE FOR SURCHARGE HEADS OVER-TOPPING THE DAM.

THE DAM IS AN EARTH EMBANKMENT EXTENDING TO THE RIGHT OF THE SPILLWAY. THE TOP OF THE DAM IS (±) AT ELEV. 1469' MSL AND HAS A LENGTH OF (±) 290'. THE TERRAIN BEYOND THE DAM, TO THE RIGHT, RAISES (±) AT 7" TO 1' SLOPE. (SEE SKETCH P. D-4)

THE EMBANKMENT IS (±) 8' WIDE AT THE TOP AND HAS (±) 2.5" TO 1' AND (±) 3" TO 1', U/S AND D/S FACE SLOPES, RESPECTIVELY.

ASSUME $C=3.0$ FOR THE OVERFLOW AT THE DAM AND
$C=2.0$ FOR THE OVERFLOW AT THE TERRAIN TO THE RIGHT.

USING THE SPILLWAY CREST ELEVATION AS DATUM AND, AN EQUIVALENT LENGTH FOR THE SLOPING TERRAIN, THE FOLLOWING EQUATIONS APPROXIMATE THE OVERFLOW:

1') DAM: $L_D \simeq 290' \quad Q_D \simeq 870(H-5)^{3/2}$

2') TERRAIN TO THE RIGHT OF THE DAM:

$$L'_R \simeq \frac{2}{3}(7)(H-5) \quad \therefore \quad Q'_R \simeq 9.3(H-5)^{5/2}$$

THEREFORE, THE TOTAL OVERFLOW RATING CURVE CAN BE APPROXIMATED BY:

$$Q_S = Q'_S + (Q_L^*)_1^* + (Q_L)_2 + (Q'_L)_3 + Q_{DK}^* + Q_D + Q'_R$$

WHERE THE EXPRESSIONS $(Q_L^*)_1^*$ (P. D-4) AND $(Q_{DK})^*$ (P. D-7) WILL

NORTH POND DAM

3- Cont'd) SURCHARGE AT PEAK INFLOW

d) SURCHARGE HEIGHT TO PASS (Q_{P_1}):

i) @ Q_{P_1} = PMF = 2300 CFS — $(H_1)_1 \cong 2.3'$ (W/DIKES OVERFLOW); $(H_1)_2 \cong 5.2'$ (W/O DIKES OVERFLOW)

ii) @ $Q'_{P_1} = \frac{1}{2}$ PMF = 1150 CFS — $(H'_1)_1 \cong 1.8'$ (W/DIKES OVERFLOW); $(H'_1)_2 \cong 3.8'$ (W/O DIKES OVERFLOW)

4) EFFECT OF SURCHARGE STORAGE ON MAX. PROBABLE DISCHARGES (OUTFLOW):

a) POND (LAKE) AREA @ FLOW LINE: $^*A \cong 185$ AC

AVE. LAKE AREA WITHIN EXPECTED SURCHARGE: $^*\bar{A} \cong 237$ AC.
*See "STORAGE" P. D-2

b) ASSUME NORMAL POOL LEVEL AT SPILLWAY CREST (EL. 1464' MSL)

c) WATERSHED AREA: D.A. $\cong 0.94$ SQ MI (See P. D-1)

d) DISCHARGE (Q_{P_2}) AT VARIOUS HYPOTHETICAL SURCHARGE ELEVATIONS:

$H = 4'$ $V = 237 \times 4 = 948$ AC FT $\therefore S = \frac{948}{0.94 \times 53.3} = 18.9"$

$H = 2'$ $V = 474$ AC FT $\therefore S = 9.46"$

∴ FROM APPROXIMATE STORAGE ROUTING NED ACE GUIDELINES (19" MAX. PROBABLE RO. IN NEW ENGLAND) D-1C

$Q_{P_2} = Q_{P_1}\left(1 - \frac{S}{19}\right)$ AND FOR ½ PMF: $Q'_{P_2} = Q'_{P_1}\left(1 - \frac{S}{9.5}\right)$

NORTH POND DAM

4-Cont'd) EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOW

∴ FOR THE ABOVE HYPOTHETICAL SURCHARGES:

$H=4'$ $Q_{P_2} \doteq 10^{CFS}$ —

$H=2'$ $Q_{P_2} \doteq 1160^{CFS}$ $Q'_{P_2} \doteq 5^{CFS}$

AND, ACTUALLY, FOR $H=0$; $Q_{P_2} = 2300^{CFS}$; $Q'_{P_2} = 1150^{CFS}$

e) PEAK OUTFLOW (Q_{P_3})

USING NED-ACE GUIDELINES "SURCHARGE STORAGE ROUTING" ALTERNATE METHOD (See p. D-9)

i) INCLUDING DIKES (NE) OVERFLOW:

$(Q_{P_3})_1 \doteq 1240^{CFS}$ (TOTAL - $Q_{DAM} \doteq 310^{CFS}$; $Q_{DK} \doteq 930^{CFS}$); $(H_3)_1 \doteq 1.8'$ FOR Q_{P_1} = PMF

$(Q'_{P_3})_1 \doteq 400^{CFS}$ (TOTAL - $Q_{DAM} \doteq 190^{CFS}$; $Q_{DK} \doteq 210^{CFS}$); $(H'_3)_1 \doteq 1.3'$ FOR Q'_{P_1} = ½ PMF

ii) ASSUMING NO OVERFLOW AT N.E. DIKES & DEPRESSION:

$(Q_{P_3})_2 \doteq 640^{CFS}$; $(H_3)_2 \doteq 2.9'$ FOR Q_{P_1} = PMF

$(Q'_{P_3})_2 \doteq 240^{CFS}$; $(H'_3)_2 \doteq 1.6'$ FOR Q'_{P_1} = ½ PMF

NORTH POND DAM

4-Cont'd) EFFECT OF SURCHARGE STORAGE ON PEAK OUTFLOW

f) SPILLWAY CAPACITY RATIO TO OUTFLOW:

i) SPILLWAY CAPACITY TO TOP OF N.E. DIKES: $Q_s' \approx 120^{cfs}$ (See p. D-9)

∴ THE SPILLWAY CAPACITY IS (±)10% THE OUTFLOW AT PMF ($(Q_p)_1$ - INCLUDING THE NE. OVERFLOW) AND, LIKEWISE, (±)30% THE OUTFLOW AT ½ PMF, $(Q_{p_3}')_1$

ii) SPILLWAY CAPACITY TO TOP OF DAM (ASSUMING NO DIKES OVERFLOW)

IF THE N.E. DIKES & DEPRESSION ARE RAISED SO AS TO PREVENT THEIR OVERTOPPING, THE SPILLWAY CAPACITY TO TOP OF THE DAM IS: $Q_s'' \approx 2100^{cfs}$ (see p. D-9) OR (±)330% THE OUTFLOW $(Q_p)_2$ AT PMF AND (±)880% THE OUTFLOW $(Q_{p_3}')_2$ AT ½ PMF.

iii) SPILLWAY CAPACITY TO TOP OF LEFT SIDE TERRAIN (ROCK LEDGE BANK) (±)EL. 1467' MSL (See p. D-4) - (ASSUMING NO DIKES OVERFLOW)

ALTHOUGH THE ROCK LEDGE BANK TO THE LEFT OF THE SPILLWAY IS INCLUDED IN THE SPILLWAY CAPACITY TO TOP OF DAM (f, ii ABOVE), THE ACTUAL CONCRETE SPILLWAY FROM THE RIGHT SIDE WALL TO THE TOP OF THE 3' HIGH LEDGE WHICH ENDS THE SPILLWAY TO THE LEFT HAS APPROXIMATELY A CAPACITY OF $Q_s''' \approx 680^{cfs}$ OR (±)106% THE OUTFLOW $(Q_p)_2$ AT PMF (W/ NO NE. OVERFLOW) AND (±)280% THE OUTFLOW $(Q_{p_3}')_2$ AT ½ PMF (See p. D-11 AND OUTFLOW RATING CURVE ON p. D-9)

NORTH POND DAM

J-Cont'd) PERFORMANCE AT TEST FLOOD CONDITIONS

5) SUMMARY

a) PEAK INFLOW: $Q_{P_1} = PMF \doteq 2300^{CFS}$ $Q'_{P_1} = \frac{1}{2} PMF \doteq 1150^{CFS}$

b) PEAK OUTFLOW:
i) DAM + NE OVERFLOW: $(Q_{P_3})_1 \doteq 1240^{CFS}$ $(Q'_{P_3})_1 \doteq 400^{CFS}$
ii) DAM W/NO NE OVERFLOW: $(Q_{P_3})_2 \doteq 640^{CFS}$ $(Q'_{P_3})_2 \doteq 240^{CFS}$

c) SPILLWAY CAPACITY:
i) TO FIRST POINT OF OVERFLOW (NE DIKES): $Q'_S \doteq 120^{CFS}$ OR, (±) 10% OF $(Q_{P_3})_1$, AND (±) 30% OF $(Q'_{P_3})_1$,
ii) TO TOP OF DAM (IF DIKES ARE RAISED): $Q''_S \doteq 2100^{CFS}$ (INCLUDING LEFT ROCK LEDGE OVERFLOW) OR, (±) 330% OF $(Q_{P_3})_2$ AND (±) 880% OF $(Q'_{P_3})_2$
iii) TO TOP OF ROCK LEDGE TO THE LEFT OF THE SPILLWAY (ASSUMING NO NE. OVERFLOW): $Q'''_S \doteq 680^{CFS}$ OR, (±) 106% OF $(Q_{P_3})_2$ AND (±) 280% OF $(Q'_{P_3})_2$.

THEREFORE, AT SDF = PMF THE DIKES AND DEPRESSION AT THE NE SHORE OF THE LAKE ARE OVERTOPPED (±) 0.8' (W.S. EL 1465.8' MSL). THE N.E. OVERFLOW IS (±) 930 CFS; THE CORRESPONDING SPILLWAY SURCHARGE IS (±) 1.8' AND THE ESTIMATED FREEBOARD TO THE TOP OF THE DAM IS (±) 3.2'. W/O DIKES OVERFLOW, THE SPILLWAY SURCHARGE WILL BE (±) 3' (W.S. EL. 1467' MSL) AND THE FREEBOARD IS (±) 2'.

SIMILARLY, AT TEST FLOOD $Q'_P = \frac{1}{2}$ PMF THE DIKES/DEPRESSION ARE OVERTOPPED (±) 0.3' (W.S. EL. 1465.3' MSL). THE NE OVERFLOW IS (±) 210 CFS. THE CORRESPONDING SPILLWAY SURCHARGE IS (±) 1.3' AND THE DAM ESTIMATED FREEBOARD IS (±) 3.7'. W/O DIKES OVERFLOW, THE SPILLWAY SURCHARGE WILL BE (±) 1.6' (W.S. EL. 1465.6' MSL) AND THE FREEBOARD IS (±) 3.4'.

NORTH POND DAM

2,6-Cont'd) FAILURE AT NORTH POND DAM - PEAK FAILURE OUTFLOW

i) HEIGHT AT TIME OF FAILURE: $Y_o \approx 1467 - 1449 \approx 18'$

ii) SPILLWAY DISCHARGE: $Q_s = 640^{CFS}$ (see p. D-11)

iii) BREACH OUTFLOW: $Q_b = \frac{8}{27} W_b \sqrt{g}\, Y_o^{3/2} \approx 9000^{CFS}$

iv) PEAK FAILURE OUTFLOW: $Q_{P_1} = Q_s + Q_b \approx \underline{9600}^{CFS}$

c) FLOOD DEPTH IMMEDIATELY D/S FROM DAM: $Y \approx 0.44\, Y_o \approx 7.9$ say $\underline{8'}$

d) ESTIMATE OF D/S DAM FAILURE CONDITIONS AT IMPACT AREA.

i) REACH BETWEEN NORTH POND AND REUBEN HART RESERVOIR:

THE CHANNEL IS COMPOSED OF TWO DISTINCT REACHES ONE, (±) 11000' LONG, (±) 500' WIDE AT THE BASE, (±) 8" TO 1' SIDE SLOPES AND (±) 1.5% SLOPE. THE SECOND REACH (±) 5500' LONG, IS A "V" SHAPED STEEP CHANNEL ((±) 6% SLOPE) WITH (±) 5" TO 1' SIDE SLOPES.

THEREFORE, ONLY THE FIRST REACH IS ASSUMED TO HAVE SOME "EFFECT" ON THE PEAK INFLOW TO REUBEN HART RESERVOIR:

ii) NORTH POND STORAGE AT TIME OF FAILURE: $S \approx 3000^{AC\,FT}$ (see p. D-2)

iii) PEAK INFLOW TO REUBEN HART RESERVOIR (see NED-ACE GUIDELINES):

$Q_{P_1} \approx 9600^{CFS} \therefore {}^*Y_1 \approx 2.7'$; $V_1 = 354^{AC\,FT}$ (ON REACH OF 11000'; $^*n = 0.052$)

$Q_{P_2} = Q_{P_1}\left(1 - \frac{V}{S}\right) \approx 8470^{CFS} \therefore Y_2 \approx 2.5'$; $V_2 \approx 326^{AC\,FT}$; $\bar{V} = 340^{AC\,FT} \therefore Q_{P_3} \approx \underline{8500}^{CFS}$

NORTH POND DAM

2,d-Cont'd) FAILURE OF NORTH POND DAM - CONDITIONS AT IMPACT AREA

(d) REUBEN HART RESERVOIR OUTFLOW

FROM THE NED-ACE PHASE I INSPECTION REPORT FOR REUBEN HART RESERVOIR DAM (CT-00096), DATED 1978, "SURCHARGE STORAGE DATA" (P. D-7) AND "SPILLWAY DISCHARGE CURVES" (P. D-3) OF THE REPORT, BY APPROXIMATE ROUTING:

$Q_{P_1} \doteq 8500^{CFS}$ $\therefore$ $Q_{P_3} = 6600^{CFS}$ COMBINED RESERVOIR OUTFLOW

FROM THIS OUTFLOW THE AUXILIARY SPILLWAY DISCHARGE TO HART BROOK IS (±) $Q'_{P_3} = \underline{1200}^{CFS}$ ((±) 5400 CFS TO HALL MEADOW RES.)

FROM THE HART BROOK D/S RATING CURVE AT DRAKEVILLE (±) 1¼ mi D/S, A STAGE DEPTH OF (±) $Y_2 \doteq \underline{3.6}'$ IS EXPECTED FOR THE ABOVE PEAK FAILURE DISCHARGE OF (±) $Q'_{P_3} = \underline{1200}^{CFS}$

3) FAILURE OF THE SOUTH DIKE AT THE N.E. SHORE OF NORTH POND.

a) BREACH WIDTH: $W_b \doteq \underline{60}'$ (MID-HT. LENGTH $L \doteq 150'$ FROM C.E. FIELD OBSERV.)

b) PEAK FAILURE OUTFLOW (Q_{P_1})

i) HEIGHT AT TIME OF FAILURE: $^*Y_o \doteq 15'$ FOR SURCHARGE TO TOP OF DIKE

ii) BREACH OUTFLOW: $Q_b = \frac{8}{27} W_b \sqrt{g}\, Y_o^{3/2} \doteq 5900^{CFS}$

$\therefore$ iii) $Q_{P_1} = Q_b \doteq \underline{5900}^{CFS}$

*C.E. FIELD MEASURE (SURVEY 6/6/79)

NORTH POND DAM

3-Cont'd) FAILURE OF THE SOUTH DIKE

c) FLOOD DEPTH IMMEDIATELY D/S FROM DIKE:

$$Y_n \cong 0.44 Y_o \cong \underline{6.6'}$$

d) ESTIMATE OF D/S DAM FAILURE CONDITIONS AT IMPACT AREA:

(SEE NED-ACE GUIDELINES FOR ESTIMATING D/S DAM FAILURE HYDROGRAPH)

i) RESERVOIR STORAGE AT TIME OF FAILURE: $S \cong 2500^{AFT}$ (see p. D-2)

ii) THE FLOOD UPON FAILURE OF THE DIKE WILL TRAVEL OVER THE MOUNTAIN RELATIVELY STEEP SLOPE, INTO A "V" SHAPED CHANNEL WITH (±) 10H TO 1V SIDE SLOPES AND (±) 1.7% SLOPE TOWARDS THE HOVER POND/EAST STREET IMPACT AREA. (ASSUME $n \cong 0.040$) NO APPRECIABLE VALLEY STORAGE IN THIS FLOW REACH IS AVAILABLE TO REDUCE SIGNIFICANTLY THE PEAK FLOOD.

iii) APPROXIMATE FLOOD DEPTH AT IMPACT AREA:

$$Q_{P_1} = Q_{P_3} \cong 5900^{CFS} \quad \therefore \quad Y_3 \cong 7.2 \text{ say, } Y_3 \cong 7'$$

e) NO SIGNIFICANT DEPTH OF FLOW IS EXPECTED ON THIS CHANNEL BEFORE FAILURE. THEREFORE A RISE IN STAGE OF 6' TO 7' IS EXPECTED UPON FAILURE OF THE SOUTH DIKE.

SIMILAR ALTHOUGH OF LESSER MAGNITUDE ARE THE EFFECTS ON THE SAME IMPACT AREA EXPECTED UPON FAILURE OF THE NORTH DIKE (HEIGHT Y_o = 8' (±) AND MID-HEIGH LENGTH (±) 90')

NORTH POND DAM

II - Cont'd) DOWNSTREAM FAILURE HAZARD

A) SUMMARY:

a) FAILURE AT NORTH POND DAM - (FLOOD TO HART BROOK)

i) PEAK FAILURE OUTFLOW: $Q_{P_1} \doteq 9600^{CFS}$
ii) REACH OUTFLOW TO HART BROOK D/S FROM REUBEN HART RES.: $Q_{P_2} \doteq 1200^{CFS}$ (5400^{CFS} TO HALL MEADOW BRK. RESERVOIR.)
iii) FLOOD DEPTH IMMEDIATELY D/S FROM DAM: $Y \doteq 8'$
iv) STAGE AT IMPACT AREA AFTER FAILURE: $Y_3 \doteq 3.6'$ (ASSUMING NO OTHER FLOW IN CHANNEL BEFORE FAILURE - *SEE NOTE.)

b) FAILURE AT NE SHORE DIKES (S. DIKE) - (FLOOD TO HOOVER POND/EAST ST.)

i) PEAK FAILURE OUTFLOW: $Q_{P_1} \doteq 5900^{CFS}$
ii) FLOOD DEPTH IMMEDIATELY D/S FROM DAM: $Y \doteq 6.6'$
iii) APPROXIMATE STAGE AT IMPACT AREA AFTER FAILURE: $Y_3 \doteq 7'$ (NO SIGNIFICANT WATER DEPTH BEFORE FAILURE IS ASSUMED IN THE CHANNEL)

*NOTE: FLOW AND CORRESPONDING STAGE AT HART BROOK D/S FROM HALL MEADOW BROOK AND REUBEN HART RESERVOIRS, BEFORE FAILURE IS RELATIVELY INDEPENDENT OF THE SPILLWAY OUTFLOW AT NORTH POND, AND IS A FUNCTION OF THE RELEASE FROM THE ABOVE RESERVOIRS. THEREFORE, CONDITIONS BEFORE N. POND DAM FAILURE AT THE POTENTIAL IMPACT AREA, D/S FROM THE TWO MENTIONED RESERVOIRS ARE INDETERMINATE

PRELIMINARY GUIDANCE
FOR ESTIMATING
MAXIMUM PROBABLE DISCHARGES
IN
PHASE I DAM SAFETY
INVESTIGATIONS

New England Division
Corps of Engineers

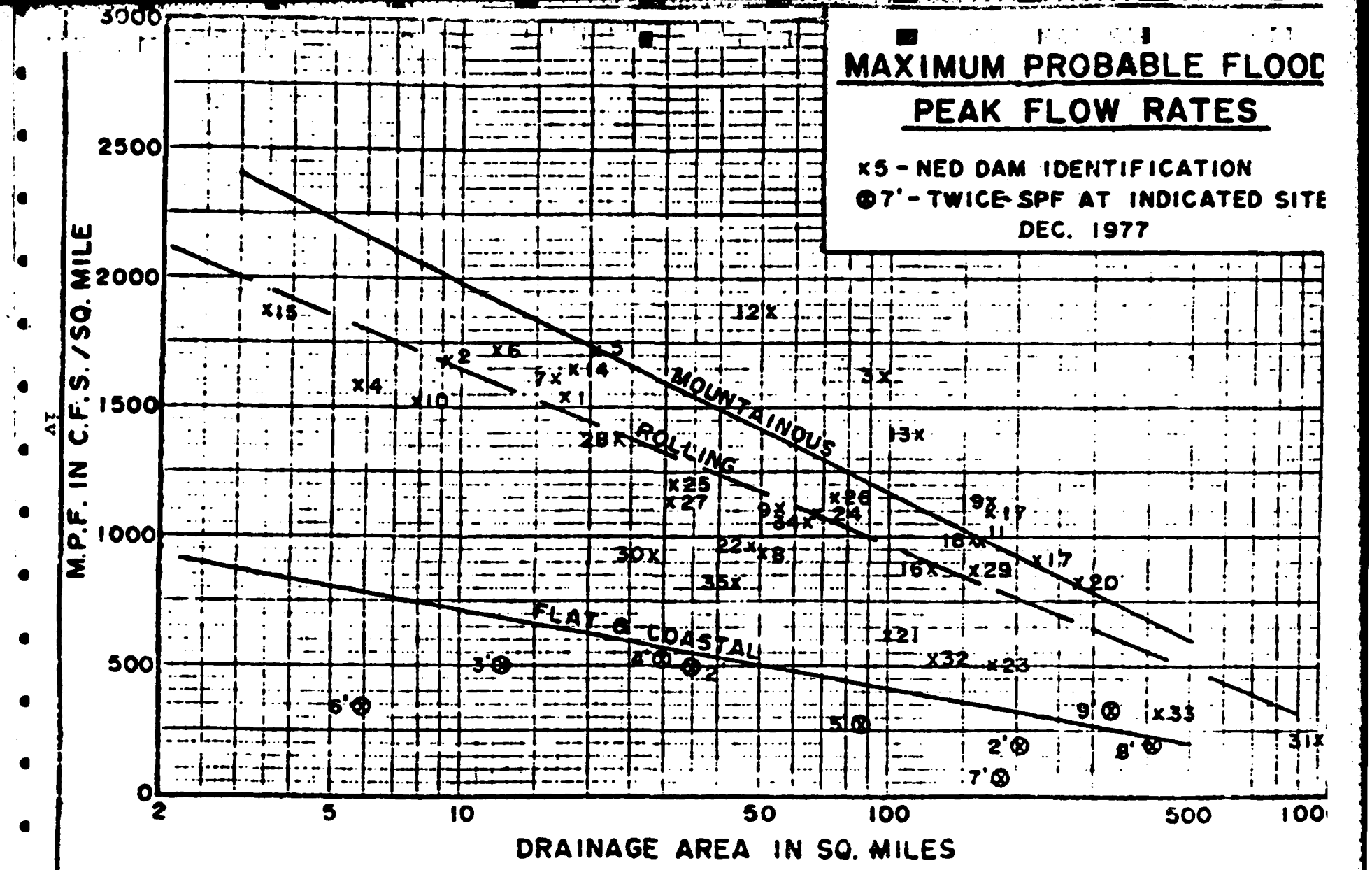
March 1978

MAXIMUM PROBABLE FLOOD INFLOWS
NED RESERVOIRS

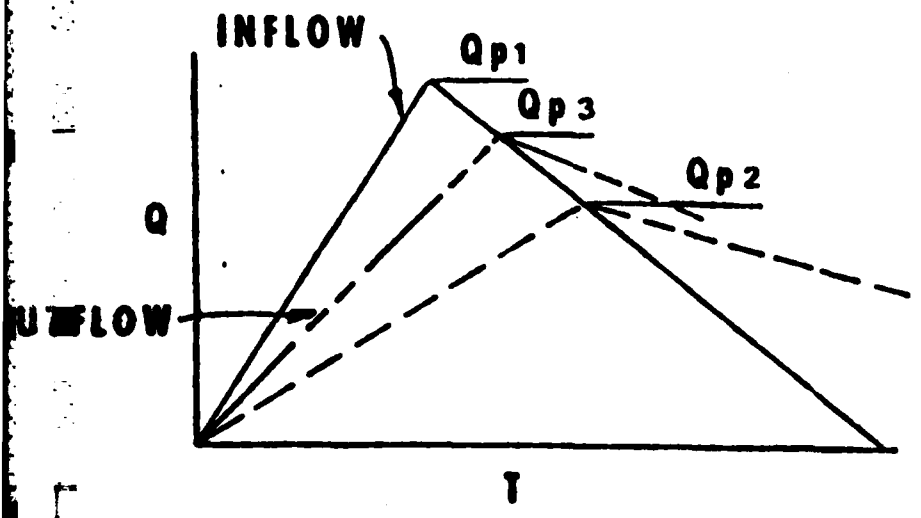
	Project	Q (cfs)	D.A. (sq. mi.)	MPF cfs/sq. mi.
1.	Hall Meadow Brook	26,600	17.2	1,546
2.	East Branch	15,500	9.25	1,675
3.	Thomaston	158,000	97.2	1,625
4.	Northfield Brook	9,000	5.7	1,580
5.	Black Rock	35,000	20.4	1,715
6.	Hancock Brook	20,700	12.0	1,725
7.	Hop Brook	26,400	16.4	1,610
8.	Tully	47,000	50.0	940
9.	Barre Falls	61,000	55.0	1,109
10.	Conant Brook	11,900	7.8	1,525
11.	Knightville	160,000	162.0	987
12.	Littleville	98,000	52.3	1,870
13.	Colebrook River	165,000	118.0	1,400
14.	Mad River	30,000	18.2	1,650
15.	Sucker Brook	6,500	3.43	1,895
16.	Union Village	110,000	126.0	873
17.	North Hartland	199,000	220.0	904
18.	North Springfield	157,000	158.0	994
19.	Ball Mountain	190,000	172.0	1,105
20.	Townshend	228,000	106.0(278 total)	820
21.	Surry Mountain	63,000	100.0	630
22.	Otter Brook	45,000	47.0	957
23.	Birch Hill	88,500	175.0	505
24.	East Brimfield	73,900	67.5	1,095
25.	Westville	38,400	99.5(32 net)	1,200
26.	West Thompson	85,000	173.5(74 net)	1,150
27.	Hodges Village	35,600	31.1	1,145
28.	Buffumville	36,500	26.5	1,377
29.	Mansfield Hollow	125,000	159.0	786
30.	West Hill	26,000	28.0	928
31.	Franklin Falls	210,000	1000.0	210
32.	Blackwater	66,500	128.0	520
33.	Hopkinton	135,000	426.0	316
34.	Everett	68,000	64.0	1,062
35.	MacDowell	36,300	44.0	825

MAXIMUM PROBABLE FLOWS BASED ON TWICE THE STANDARD PROJECT FLOOD (Flat and Coastal Areas)

River	SPF (cfs)	D.A. (sq. mi.)	MPF (cfs/sq. mi.)
1. Pawtuxet River	19,000	200	190
2. Mill River (R.I.)	8,500	34	500
3. Peters River (R.I.)	3,200	13	490
4. Kettle Brook	8,000	30	530
5. Sudbury River.	11,700	86	270
6. Indian Brook (Hopk.)	1,000	5.9	340
7. Charles River.	6,000	184	65
8. Blackstone River.	43,000	416	200
9. Quinebaug River	55,000	331	330


MAXIMUM PROBABLE FLOOD
PEAK FLOW RATES
x5 - NED DAM IDENTIFICATION
⊗7' - TWICE SPF AT INDICATED SITE
DEC. 1977
M.P.F. IN C.F.S./SQ. MILE AT
DRAINAGE AREA IN SQ. MILES
MOUNTAINOUS
ROLLING
FLAT & COASTAL
3000
2500
2000
1500
1000
500
0
2
5
10
50
100
500
1000

ESTIMATING EFFECT OF SURCHARGE STORAGE ON MAXIMUM PROBABLE DISCHARGES



STEP 1: Determine Peak Inflow (Qp_1) from Guide Curves.

STEP 2: a. Determine Surcharge Height To Pass "Qp_1".

b. Determine Volume of Surcharge ($STOR_1$) In Inches of Runoff.

c. Maximum Probable Flood Runoff In New England equals Approx. 19", Therefore

$$Qp_2 = Qp_1 \times \left(1 - \frac{STOR_1}{19}\right)$$

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Average "$STOR_1$" and "$STOR_2$" and Determine Average Surcharge and Resulting Peak Outflow "Qp_3".

SURCHARGE STORAGE ROUTING SUPPLEMENT

STEP 3: a. Determine Surcharge Height and "$STOR_2$" To Pass "Qp_2"

b. Avg "$STOR_1$" and "$STOR_2$" and Compute "Qp_3".

c. If Surcharge Height for Qp_3 and "$STOR_{AVG}$" agree O.K. If Not:

STEP 4: a. Determine Surcharge Height and "$STOR_3$" To Pass "Qp_3"

b. Avg. "Old $STOR_{AVG}$" and "$STOR_3$" and Compute "Qp_4"

c. Surcharge Height for Qp_4 and "New $STOR_{Avg}$" should Agree closely

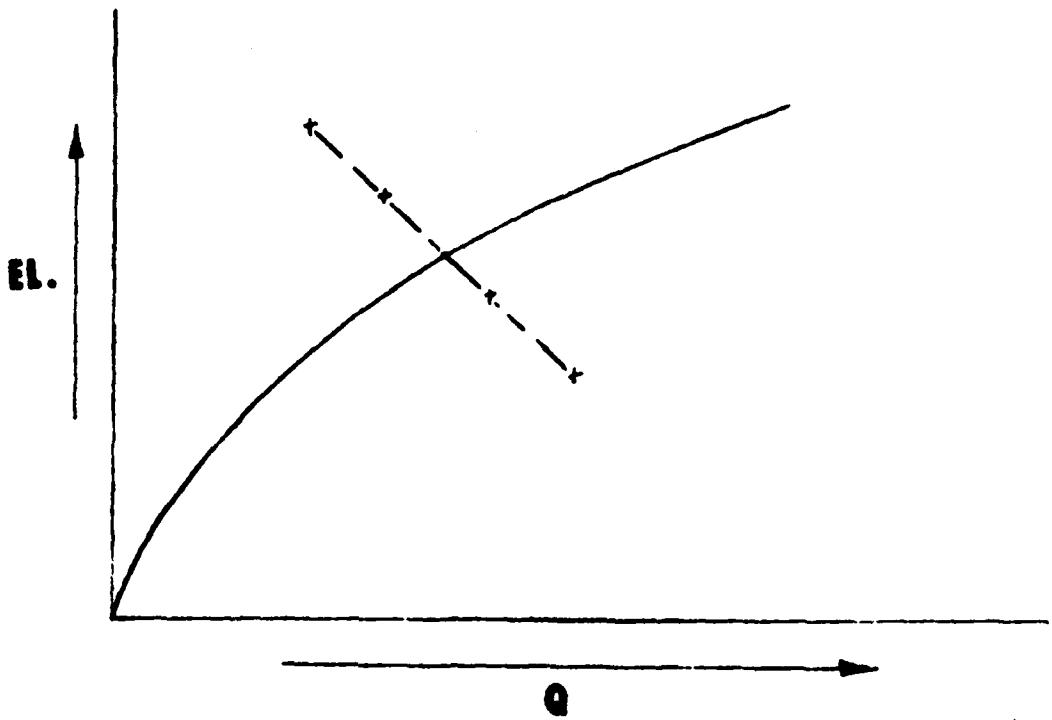
SURCHARGE STORAGE ROUTING ALTERNATE

$$Q_{p2} = Q_{p1} \times \left(1 - \frac{STOR}{19}\right)$$

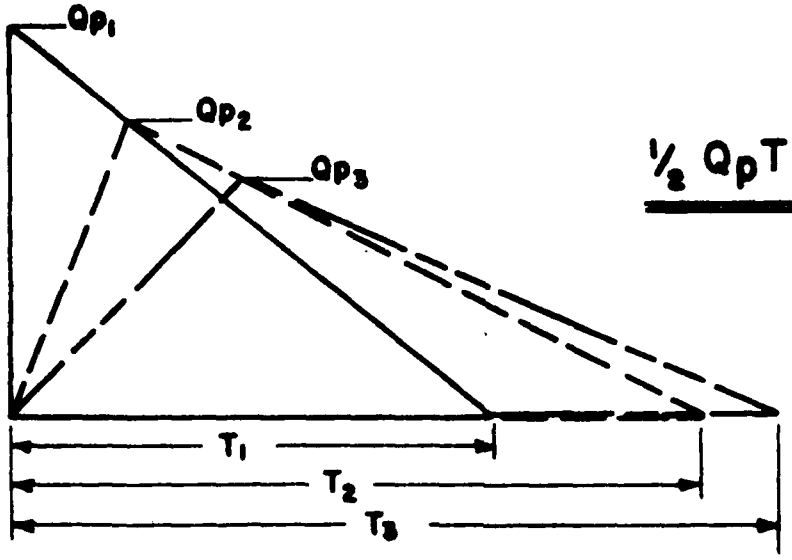
$$Q_{p2} = Q_{p1} - Q_{p1}\left(\frac{STOR}{19}\right)$$

FOR KNOWN Q_{p1} AND 19" R.O.

Q_{p2}	STOR	EL.



"RULE OF THUMB" GUIDANCE FOR ESTIMATING DOWNSTREAM DAM FAILURE HYDROGRAPHS



$\frac{1}{2} Q_p T = 12 S$

STEP 1: DETERMINE OR ESTIMATE RESERVOIR STORAGE (S) IN AC-FT AT TIME OF FAILURE.

STEP 2: DETERMINE PEAK FAILURE OUTFLOW (Q_{p1}).

$$Qp_1 = \frac{8}{27} W_b \sqrt{g} Y_o^{\frac{3}{2}}$$

W_b = BREACH WIDTH - SUGGEST VALUE NOT GREATER THAN 40% OF DAM LENGTH ACROSS RIVER AT MID HEIGHT.

Y_o = TOTAL HEIGHT FROM RIVER BED TO POOL LEVEL AT FAILURE.

STEP 3: USING USGS TOPO OR OTHER DATA, DEVELOP REPRESENTATIVE STAGE-DISCHARGE RATING FOR SELECTED DOWNSTREAM RIVER REACH.

STEP 4: ESTIMATE REACH OUTFLOW (Q_{p2}) USING FOLLOWING ITERATION.

A. APPLY Q_{p1} TO STAGE RATING, DETERMINE STAGE AND ACCOPMANYING VOLUME (V_1) IN REACH IN AC-FT. (NOTE: IF V_1 EXCEEDS 1/2 OF S, SELECT SHORTER REACH.)

B. DETERMINE TRIAL Q_{p2}.

$$Qp_2(TRIAL) = Qp_1 (1 - \frac{V_1}{S})$$

C. COMPUTE V_2 USING Q_{p2} (TRIAL).

D. AVERAGE V_1 AND V_2 AND COMPUTE Q_{p2}.

$$Qp_2 = Qp_1 (1 - \frac{V_{avg}}{S})$$

STEP 5: FOR SUCCEEDING REACHES REPEAT STEPS 3 AND 4.

APRIL 1978

APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(10) NAME	(11) LATITUDE (NORTH)	(12) LONGITUDE (WEST)	(13) REPORT DATE DAY | MO | YR
CT	450	NED	CT	005	06				NORTH POND DAM	4154.5	7313.2	31AUG79

(14) POPULAR NAME	(15) NAME OF IMPOUNDMENT
	NORTH POND

(16) REGION	(17) BASIN	(18) RIVER OR STREAM	(19) NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	(20) DIST FROM DAM (MI.)	(21) POPULATION
01	07	HART BROOK	DRAKEVILLE	5	2000

(22) TYPE OF DAM	(23) YEAR COMPLETED	(24) PURPOSES	(25) STRUCTURAL HEIGHT (FT.)	(26) HYDRAULIC HEIGHT (FT.)	(27) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(28) IMPOUNDING CAPACITIES NORMAL (ACRE-FT.)
REPG	1840	S	20	20	3500	2300

DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
NED	N	N	N	N	

(29) REMARKS
20-ESTIMATE 22-LATER RAISED FOUR FEET DATE UNCERTAIN

(30) D/S HAS	(31) SPILLWAY CREST LENGTH	(32) SPILLWAY TYPE	(33) SPILLWAY WIDTH (FT.)	(34) MAXIMUM DISCHARGE (FT.)	(35) VOLUME OF DAM (CY)	(36) POWER CAPACITY INSTALLED (MW)	(37) POWER CAPACITY PROPOSED (MW)	(38) NAVIGATION LOCKS NO.	(39) LENGTH (FT.)	(40) WIDTH (FT.)	(41) LENGTH (FT.)	(42) WIDTH (FT.)	(43) LENGTH (FT.)	(44) WIDTH (FT.)	(45) LENGTH (FT.)	(46) WIDTH (FT.)
3	325	U	37	2100												

(47) OWNER	(48) ENGINEERING BY	(49) CONSTRUCTION BY
TORRINGTON WATER COMPANY	UNKNOWN	UNKNOWN

(50) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES

(51) INSPECTION BY	(52) INSPECTION DATE DAY | MO | YR	(53) AUTHORITY FOR INSPECTION
CAHN ENGINEERS INC	05APR79	PL 92-367

(54) REMARKS
54-ALSO 06JUN79

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) IDENTITY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	(9) NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY	MO	YR
CT	681	NED	CT	005	06				NORTH POND DIKES	4155.2	7313.1	31	AUG	79

(10) POPULAR NAME	(11) NAME OF IMPOUNDMENT
NORTH DIKE AND SOUTH DIKE	NORTH POND

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	(18) NEAREST DOWNSTREAM CITY-TOWN-VILLAGE	(19) DIST FROM DAM (MI.)	(20) POPULATION
01	07	TR-HALL MEADOW BROOK	DRAKEVILLE	5	2000

(21) TYPE OF DAM	(22) YEAR COMPLETED	(23) PURPOSES	(24) STRUCTURAL HEIGHT (FT.)	(25) HYDRAULIC HEIGHT (FT.)	(26) IMPOUNDING CAPACITIES MAXIMUM (ACRE-FT.)	(27) NORMAL (ACRE-FT.)	DIST	OWN	FED R	PRV/FED	SCS A	VER/DATE
REPG	1913	S	15	15	2500	2300	NED	N	N	N	N	

(28) REMARKS
20-ESTIMATE 22-AFTER 24,25-SOUTH DIKE NORTH DIKE 15 +15

(29) D/S HAS	(30) SPILLWAY CREST LENGTH	SPILLWAY TYPE	SPILLWAY WIDTH (FT.)	(31) MAXIMUM DISCHARGE (FT.)	(32) VOLUME OF DAM (CY)	(33) POWER CAPACITY INSTALLED (MW)	(34) PROPOSED (MW)	(35) NAVIGATION LOCKS NO.	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)	LENGTH (FT.)	WIDTH (FT.)
1	320	N														

(36) OWNER	(37) ENGINEERING BY	(38) CONSTRUCTION BY
TORRINGTON WATER COMPANY	UNKNOWN	UNKNOWN

(39) REGULATORY AGENCY			
DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES	CT WATER RESOURCES

(40) INSPECTION BY	(41) INSPECTION DATE DAY	MO	YR	(42) AUTHORITY FOR INSPECTION
CAHN ENGINEERS INC	06	JUN	79	PL 92-367

(43) REMARKS
30-TOTAL TWO DIKES 32-SPILLWAY AT NORTH POND DAM CT450

GE. FIELD MEASURE (SURVEY 9/6/79)

END

FILMED

10-84

DTIC